BRITISH COLUMBIA
anada's Pacific Gateway

EXPLORATION AND MINING in British Columbia 2008

**Ministry of Energy, Mines
and Petroleum Resources
Mining and Minerals Division**

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Front Cover:
A detailed in-fill drilling program was conducted in the Main zone of the Kutcho Creek deposit in 2008. Sherwood Copper Corporation completed its acquisition of Western Keltic Mines Inc in early 2008 and merged with Capstone Mining Corporation in September 2008. The two companies are now Capstone Mining Corporation. The Kutcho Creek Cu-Zn-Ag-Au Volcanic Massive Sulphide deposit is located approximately 100 km east of Dease Lake. Drilling amounted to 9900 m in 81 holes. Measured and indicated resources at Kutcho Creek total 17 690 706 tonnes, grading 1.17% Cu, 2.36% Zn, 27.5 g/t Ag and 0.34g/t Au. (Photo Credit: Jay Fredericks)

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FOREWORD

INTRODUCTION

Exploration and Mining in British Columbia 2008 represents the latest addition to continuing documentation of the activity of the province's exploration and mining industry that goes back to 1874 when the *Annual Report of the British Columbia Minister of Mines* first went to print. It supports one of the best geoscience databases in the world, featuring free and public Internet access through MapPlace and a comprehensive record of industry and government-generated geoscience information.

This publication is closely linked to its companion document *British Columbia Mines and Mineral Exploration Overview 2008,* by giving a more detailed description of key projects, documenting additional exploration efforts and providing a regional perspective on the exploration and mining industry.

BC's Regional Geologists and the Mineral Development Office

This document is primarily compiled and written by BC's Regional Geologists with the assistance of other individuals as acknowledged below. The Regional Geologists are located in Cranbrook (Dave Grieve), Kamloops (Bruce Madu), Prince George (John DeGrace), Smithers (Paul Wojdak) and Vancouver (Bruce Northcote). They support the Mineral Development Office in Vancouver (Jay Fredericks, Director) in providing front-line stimulation and promotion of mineral exploration and development in the province.

Key functions of all these individuals include:

- Fostering sustainable exploration, development and use of the Province's mineral and coal resources;
- Providing clients with technical information and professional advice about known and potential mineral and coal deposits, including the latest information available from key geoscience applied-research organizations such as the British Columbia Geological Survey and Geoscience BC;
- Facilitating future mineral development by providing geological and mineral resource information to project review or land use decision-making processes;
- Monitoring the status of the mining industry and the development of infrastructure required for mineral resource development;
- Working on field projects and surveys, compilations, promotional brochures and deposit models; and
- Contributing information to maintain and update geoscience databases such as MINFILE, commodity files and mineral resource inventories.

Methodologies

Compilation of this publication presents certain challenges, as deadlines demand manuscript submission before all information from summer and fall programs is available. Informal surveys are undertaken to gather much of the information, and in some instances the professional judgements of the authors are employed to provide estimates that are as accurate as possible. The cooperation of the industry in providing information and access to project sites is always welcomed and sincerely appreciated. A significant amount of information comes from corporate press releases and regulatory filings. Not all active 2008 programs are included in this document: the intent is to provide an overall summary of regional levels of activity. Often missing are the early stages of exploration where prospectors comb the land, or grass roots exploration programs that are carried out below *Mines Act* permit thresholds. The authors strive to capture these activities where possible, as they are fundamental to all discoveries.

Beginning this year, exploration expenditures are broken down by category: grassroots exploration, early-stage exploration, advanced exploration/deposit appraisal, mine evaluation, and mine property exploration; in most chapters the breakdown of expenditures is displayed graphically in a pie chart. Grassroots exploration commonly does not require permitting and the proportion assigned to this category is likely to be low. Early-stage exploration involves focused activities often based on a deposit model. It may include geophysics, geochemistry, trenching and drilling. Advanced-stage exploration is concerned with resource definition emphasizing drilling and bulk sampling, but included may be baseline environmental studies, economic pre-feasibility work, and exploration of secondary targets. Mine evaluation begins with the firm commitment to develop a resource, and usually coincides with a pending application to government to open a mine; it tends to concentrate on the environmental, social, engineering and financial assessments of a project. Mine property exploration represents work on a mining property other than that done within or immediately adjacent to the producing ore deposit; it may have characteristics of early-stage or advanced exploration.

Since the exploration expenditures are ultimately estimates, final figures are rounded to the nearest whole million dollar. In prior years this was not consistently done.

MINERAL EXPLORATION SUMMARY 2008

The British Columbia mining industry began 2008 with robust mine performance and surging exploration brought on by both high demand and prices for its products. However, tightening of financial markets throughout the year led to a slowdown and, late in the year, a 50-70 per cent reduction in most commodity prices caused a sharp retrenchment among producers and contraction of exploration. Mineral exploration expenditures were $367 million, the second highest figure ever recorded.

The most popular exploration target was copper-gold deposits; many are in Quesnel and Stikine terranes. Highlight projects include the Mitchell deposit at KSM, Ajax, Kwanika, Snowfield and Woodjam. Significant copper-molybdenum programs were also completed at the Berg, Catface, Hushamu, Red Chris and Schaft Creek prospects. The next most sought-after metal was molybdenum, with which British Columbia is richly endowed and is Canada's only producer. Exploration was activated at the past-producing Kitsault mine which came under new ownership, and exciting results were released on the Storie, Lone Pine, Haskins, Falcon, McFarlane, Chu and Nithi Mountain projects.

The search for gold includes a wide range of deposit types and spans nearly all tectonic terranes. Active districts in 2008 include the 'Golden Triangle' (Homestake Ridge, Dilworth and Silver Coin projects), Barkerville (Spanish Mountain and FraserGold projects) and Atlin (Yellow Jacket project).

Further emphasizing British Columbia's diverse geological potential is its rich heritage of volcanic and sediment-hosted massive sulphide mines. Highlights from 2008 include the Kutcho Creek, Akie, Ruddock Creek, Frank Creek, Bodine and the newly recognized Thor projects. Work continued on the Turnagain nickel project, Jersey-Emerald tungsten property and the Blue River niobium-tantalum property.

Coal exploration in northeast and southeast BC accounted for significant portions of the total activity in those regions. Notably, exploration expenditures in the northeast region were double 2007 levels. Major projects included Huguenot, Belcourt West and Goodrich in the northeast and Mt. Michael, Castle Mountain, Marten-Wheeler and Crowsnest in the southeast. In the case of the Crowsnest project in the Fernie area and the Goodrich Central South property in the northeast, the potential for underground mining is being considered.

The British Columbia Geological Survey, working in the central interior, Quesnel, 100 Mile House, Merritt, Princeton, Terrace and other strategic areas, made several exciting discoveries and produced new maps and reports. Geoscience BC's initiation of the QUEST WEST program of grassroots geophysical and geochemical surveys in the extensively drift-covered west-central portion of the province was essential to spurring exploration activities in this region of British Columbia.

MINING SUMMARY 2008

British Columbia is a significant producer of coal, copper, molybdenum, gold, silver, zinc, industrial minerals and construction aggregate, with a total forecast value of $5700 million for 2008. Expansion continued at Highland Valley Copper, one of the world's largest open pit copper-molybdenum mines. Expansion and modernization began at the Endako molybdenum mine, BC's oldest operating mine. The small, but high grade, MAX molybdenum mine completed its first full year of operation. Operations continued at the Kemess and Mount Polley copper-gold mines and at the Gibraltar and Huckleberry copper-molybdenum mines although some staff were laid off. Myra Falls, an important producer of zinc, copper, lead, silver and gold, faced challenges with staying profitable as zinc prices declined. Eskay Creek gold-silver mine closed in the first quarter of 2008 and most of the site has been reclaimed. The small QR gold mine experienced difficulties in its conversion to underground mining and came under new management. A successful underground bulk sample from the Lexington-Grenoble copper-gold project near Greenwood led to commercial operation as a small mine, BC's newest metal producer. Construction and underground development continued on the New Afton copper-gold mine but slowed late in the year. River and land-based access infrastructure for the new Tulsequah Chief polymetallic mine neared completion and underground development began. Construction of the new Ruby Creek molybdenum mine was put on hold. The large Galore Creek copper-gold project redesign continued; while at the same time significant progress was made on the mine access road. Owners of the Copper Mountain copper-gold mine, closed since 1996, announced they plan to re-develop it despite recent economic challenges.

Activity in the coal sector was particularly strong in 2008. Record prices for metallurgical and thermal coal supported an upward trend in coal exploration with several large new projects. Coal is produced from five mines in the Southeast (Fording, Greenhills, Line Creek, Elkview and Coal Mountain), three in the Northeast (Trend, Perry Creek and Brule) and one on Vancouver Island

(Quinsam). In the Northeast, Willow Creek suspended operation before returning to production. The Hermann project received an Environmental Assessment certificate. A sharp coal price decline late in the year led to a scaling back by producers although there still was a modest increase in overall coal production for 2008.

Among aggregate producers, a decrease in new building construction led to reduced demand, particularly on the west coast of the United States.

Two new projects entered the mine approval process in 2008: the Harper Creek copper and KSM gold-copper projects. The Mount Milligan and Prosperity copper-gold projects and Davidson molybdenum project are under review by the Environmental Assessment Office. Submissions are being prepared for several other metal and coal projects.

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NORTHWEST REGION

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SUMMARY AND TRENDS

The year began with robust mine performance and surging exploration brought on by both high demand and prices for metals. However, tightening financial markets began to signal a slowdown by mid-year. By late in the year, a 50-70% reduction in the price of molybdenum, copper, silver and zinc, caused a sharp retrenchment among producers and contraction of exploration. The Endako molybdenum mine postponed a major expansion and modernization program. Operations continued normally at the Huckleberry copper-molybdenum mine but reserves are limited and a decision to develop a low-grade resource must be made in 2009 if the mine is to continue beyond 2010. The Eskay Creek gold-silver mine closed in early 2008 and most of the site has been reclaimed. Production and reserves at northwest mines are listed in Table 1.1.

The pattern of mine development was uneven across the region. Development continued at the Tulsequah Chief copper-zinc-silver-gold mine, focused on construction of site infrastructure. However, work was suspended soon after it started on the Ruby Creek molybdenum deposit. Redesign of the large Galore Creek copper-gold mine continued; the project is still on hold. Significant progress was made on building the Galore Creek access road. Plans to install a bulk ship-loader at the Swamp Point aggregate quarry were shelved due to a slump in the U.S. building industry. Despite these setbacks, the total development expenditure in 2008 on Endako, Galore Creek, Swamp Point, Ruby Creek and Tulsequah is estimated at $245 million. Mines in operation, under construction and proposed for development in the Northwest Region are shown in Figure 1.1.

The KSM (Kerr-Sulphurets-Mitchell) project entered the environmental assessment process. Owners of the property claim it to be one of the five largest undeveloped gold resources in the world. The project report for the Davidson molybdenum project was submitted to government agencies and is under review. Collection of data to assess environmental impact and project design work continued at full pace on the Schaft Creek copper-molybdenum-gold project and, by new owners, on the Kutcho Creek copper-zinc project. Progress on the Morrison copper-gold and Mount Klappan coal projects was slow as their proponents seek development partners.

Mineral exploration expenditures were less than the record high set in 2007, but still strong at $140 million (Figure 1.2). Fifty-five projects exceeded $500,000 in expenditures. These are classed as major projects and listed in Table 1.2. There were 70 drilling projects and exploration drilling in the region totaled about 270 000 metres (Figure 1.3). The distribution of exploration expenditures is grassroots 1%, mine property 6%, early stage 29%, advanced stage 37% and mine evaluation 27%.

Porphyry copper-gold and copper-molybdenum deposits were the most popular exploration targets (50% of expenditures) and occur mainly in the Iskut-Stikine and Skeena districts. Porphyry molybdenum exploration accounted for 18% of spending. Gold and silver exploration (20% of expenditures) targeted a variety of epithermal and orogenic vein deposits mainly in the 'Golden Triangle' near Stewart, the Atlin and Skeena districts. Polymetallic volcanogenic massive sulphide deposits were sought in several areas and accounted for 9%. Program highlights at the time of writing include:

- **KSM**, the continued growth of the Mitchell zone as a gold-copper resource.
- **Snowfield North**, recognition of an eastern continuation of the Mitchell gold-copper zone.
- **Kitsault**, reactivation of a past-producing molybdenum project under new ownership.
- **Lone Pine**, growth of a significant new molybdenum resource.
- **Storie**, step-out holes find western extension of a major molybdenum deposit.
- **Homestake Ridge**, wide gold and silver intercepts promise a resource increase.
- **Dilworth**, drilling of three gold-silver showings found in 2007-08.
- **Yellow Jacket**, success of bulk sample and pilot mill may lead to a new gold producer.
- **Zymo**, wide copper-gold intercepts from a porphyry copper zone discovered in 2007.
- **Trek**, newly recognized copper-gold breccia on a Galore-district porphyry project.

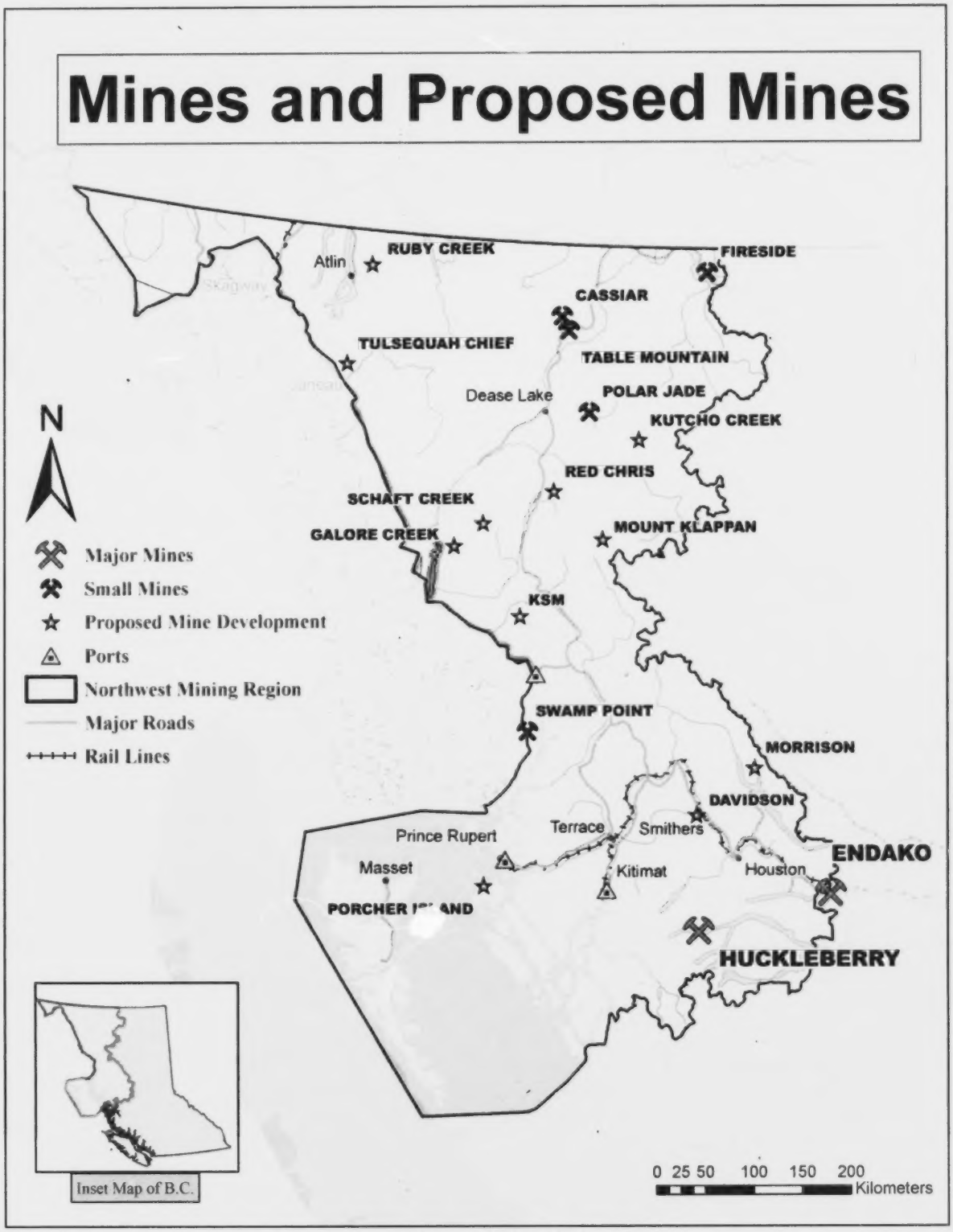


Figure 1.1. Mines and proposed mines, Northwest Region.

TABLE 1.1. MINE PRODUCTION AND RESERVES, NORTHWEST REGION

Mine	Operator	Production (2007)	Reserves (Dec 31, 2007)	Tonnes milled/ processed - 2007	Grade
Endako	Thompson Creek Metals Company & Sojitz Corporation	4292 tonnes molybdenum	292 800 000 tonnes at 0.050% Mo	9 808 000	0.06% Mo
Eskay Creek	Barrick Gold Corp	2115 kg (68 000 oz) gold, 108 978 kg silver	31 750 T at 15.7 g/t Au, 878 g/t Ag on Dec 31, 2007	139 000	20.9 g/t Au
Huckleberry	Huckleberry Mines Ltd (50% Imperial Metals Corp)	25 014 tonnes copper, 138 tonnes molybdenum	16 560 000 T at 0.352% Cu, 0.005% Mo on Dec 31, 2007	6 477 600	0.442% Cu, 0.013% Mo
Fireside	Fireside Minerals Inc	4000 tonnes	Not available	from stockpile	-

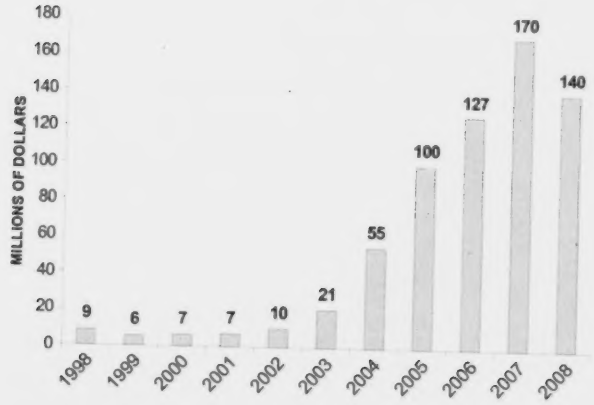


Figure 1.2. Annual exploration spending, Northwest Region.

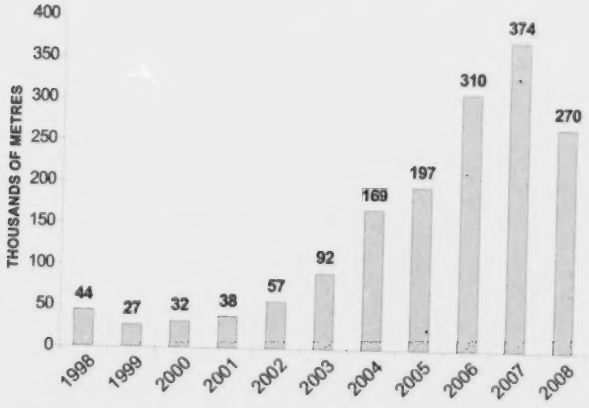


Figure 1.3. Annual exploration drilling, Northwest Region.

MINES AND QUARRIES

METAL MINES

The **Eskay Creek** mine closed in April. This trackless underground mine (Figure 1.4) produced more than 100 tonnes of gold (about 3.3 million oz) and over 5000 tonnes of silver from less than 2.3 million tonnes of ore during its 14 year life (Table 1.3). Ownership of the extremely rich mine was highly prized because it generated a great deal of wealth. Because Eskay Creek was so exceptional, its development history is summarized here. Its story has been related in greater detail in past editions of this volume. Likewise, a much more complete geological description can be found in MINFILE (104B 008) and in published journals. Eskay Creek is the almost singular example of a new type of ore deposit; an epithermal volcanogenic massive sulphide deposit formed in a shallow submarine setting and distinguished by an unusual suite of gold, silver, mercury, arsenic and antimony minerals associated with bedded base metal sulphides. Since its discovery in 1988, dozens of companies joined in the search for a second, equally rich deposit, spending more than $100 million dollars on exploration.

Mining at Eskay Creek was mainly by drift-and-fill, an expensive and therefore uncommon method. The host rock is mudstone and strongly altered rhyolite which are very weak and under high strain near the hinge of a tight anticline (Figure 1.5). Most of the principal 21B ore zone was on the west limb of the fold. The ore dipped gently and required very small stopes, typically 2.4 m wide by 2.7 m high that were backfilled with cemented river gravel. Ground failure could occur within days of stope development if not backfilled. Direct smelter treatment

TABLE 1.2. MAJOR EXPLORATION PROJECTS, NORTHWEST REGION

Property	Operator	MINFILE	Commodity	Deposit Type	Work Program
Aspira	Amarc Resources Ltd	093K 052	Cu, Zn	VMS	DD (2343 m, 11 holes); IP; A
Babs	Kenrich-Eskay Mining Corp	093L 325	Cu	Porphyry	DD (1048 m, 7 holes); G; GC
Barbara Anne	Mountain Boy Minerals Ltd	104A 178	Pb, Zn, Ag	VMS	DD (22 holes); A
Ball Creek	Paget Resources Corp	104G 018	Cu, Au	Porphyry	DD (672 m, 2 holes)
Beavis	Saturn Minerals Inc	104N 007	Au	Orogenic vein	DD (855 m, 2 holes); G
Berg	Terrane Metals Corp	093E 046	Cu, Mo	Porphyry	DD (11 661 m, 31 holes)
Big Bulk	Durango Capital Corp	103P 014, 16	Cu, Au	Porphyry	DD (2482 m, 10 holes), GC, IP
Big Onion	Eagle Peak Resources Inc	093L 124	Cu, Mo	Porphyry	DD (2350 m, 11 holes); IP
Cassiar Gold (Table Mountain)	Hawthorne Gold Corp	104P 010, 11, 15	Au	Orogenic vein	DD (2537 m); AB-EM; AB-MG
Coles Creek	Callinan Mines Ltd	093E 042	Ag	Epithermal Vein	DD (3267 m, 11holes); IP; MG; GC
Corey	Kenrich-Eskay Mining Corp	104B 240, 387	Au, Ag	Epithermal VMS	DD (1750 m, 7 holes)
Davidson	Thompson Creek Metals Company	093L 110	Mo	Porphyry	EN
Dilworth	Ascot Resources Ltd	104B 039, 142	Au, Ag	Epithermal	DD (10 886 m, 63 holes); G; GC;TR; AB-EM; AB-MG
Eaglehead	Carmax Explorations Ltd	104I 008	Cu, Mo	Porphyry	DD (5495 m, 14 holes)
Endako	Thompson Creek Mining Ltd	093K 006	Mo	Porphyry	DD (3133 m, 18 holes)
Engineer	BC Gold Corp	104M 014	Au	Epithermal Vein	DD (1825 m, 7 holes); G
FH	Durango Capital Corp	103P 155	Cu, Au	Porphyry	DD (1204 m, 4 holes)
Foremore	Roca Mines Inc	104G 148	Cu, Zn Ag, Au	VMS	DD (1520 m, 15 holes)
Galore Creek	Galore Creek Mining Corp	104G 090	Cu, Au	Alkalic Porphyry	DD (2049 m, 9 holes); GD (315 m); MS
Golden Eagle	Troymet Exploration Corp	104M 044, 74	Au	Epithermal Vein	DD (2406 m, 12 holes)
Grizzly	Inmet Mining Corp	104G 079	Cu, Au	Alkalic Porphyry	DD (2127 m, 11 holes); G; GC; IP
Groundhog	Westhawk Development Corp	104A 078	Coal	Anthracite	DD (1000 m, 11 PQ holes)
Haskins Mountain	Velocity Resources Inc	104P 059	Mo	Porphyry	DD (3427 m, 13 holes)
Homestake Ridge	Bravo Venture Group Inc	103P 216, 82, 93	Au, Ag, Zn	Vein, stratabound	DD (8602 m, 42 holes)
Joss'alun	Lomiko Resources Inc	104N 136	Cu	VMS	DD (760 m, 3 holes); AB-MG
Kalum	Mountain Capital Inc.	103I 211	Au, Ag	Intrusion-related	DD (1390 m, 11 holes); IP

TABLE 1.2. CONTINUED

Property	Operator	MINFILE	Commodity	Deposit Type	Work Program
KSM	Seabridge Gold Inc	104B 103, 176, 182	Au, Cu	Porphyry	DD (17 000 m, 30 holes); EN
Kitsault	Avanti Mining Corp	103P 120	Mo	Porphyry	DD (10 127 m, 33 holes)
Kutcho Creek	Capstone Mining Corp	104I 060	Cu, Zn	VMS	DD (9905 m, 81 holes); MS
Laura	Paget Moly Corp	093M 079	Mo	Porphyry	DD (1858 m, 8 holes)
Lennac Lake	Dentonia Resources Ltd	093L 190, 191	Cu, Mo	Porphyry	DD (1420 m, 5 holes)
Lone Pine	Bard Ventures Ltd	093L 027, 28	Mo	Porphyry	DD (18 793 m, 32 holes)
Louise Lake	North American Gem Inc	093L 079	Cu, Mo, Au	Porphyry	DD (5043 m, 16 holes); G
McKee	Saturn Minerals Inc	104N 035	Ag	Vein	DD (694 m, 4 holes); G
MO	Paget Moly Corp	104I 023, 33	Mo	Porphyry	DD (2148 m, 8 holes); G
Morrison	Pacific Booker Minerals Inc	093M 007	Cu	Porphyry	DD (3 holes); GD (3 holes)
Nak & Dorothy	Copper Ridge Explorations Inc	093M 010	Cu, Au	Porphyry	DD (1265 m, 5 holes); IP
Naskeena	Jet Gold Corp	103I 096	Coal	Anthracite	DD (1400 m, 9 holes); A
Nechako	GMV Minerals Inc		Au, Ag	Epithermal Vein	DD (2164 m, 6 holes); IP; MG
Newmont Lake	Romios Gold Resources Inc	104B 281, 282	Au, Ag	Skarn	DD (3603 m, 11 holes); G; GC; IP; AB-EM
Pass	Grand Portage Resources Ltd	093L 196	Au, Ag	Vein	DD (1570 m, 24 holes)
Peak	Grizzly Diamonds Ltd	093M 015	Au, Ag	Vein	DD (1093 m, 5 holes); IP
Red Bird	Torch River Resources Ltd	093E 026	Mo	Porphyry	DD (5000 m, 16 holes)
Red Chris	Imperial Metals Corp	104H 005	Cu, Au	Porphyry	DD (1300 m, 1 hole); A
RHG	GMV Minerals Inc	104G 178	Cu, Au	Skarn	DD (829 m, 2 holes)
Ruby Creek	Adanac Molybdenum Corp	104N 052	Mo	Porphyry	DD (15 800 m, 41 holes)
Schaft Creek	Copper Fox Metals Inc	104G 015	Cu, Mo, Au	Porphyry	DD (6958 m, 48 holes); IP; A
Seel	Gold Reach Resources Ltd	093E 105	Cu, Au	Porphyry	DD (4407 m, 21 holes)
SIB	Kenrich-Eskay Mining Corp	104B 375	Au, Ag	Epithermal VMS	DD (2333 m, 4 holes)
Silver Coin	Pinnacle Mines Ltd	104B 095	Au, Ag, Pb, Zn	Vein	DD (12 216 m, 88 holes)
Snowfield	Silver Standard Resources Inc	104B 179	Cu, Au	Porphyry	DD (16 945 m, 31 holes)
Storie	Columbia Yukon Explorations Inc	104P 069	Mo	Porphyry	DD (20 700 m, 49 holes)
Swan	Hastings Resource Corp	104O 010	Mo, W	Porphyry	DD (1000 m, 13 holes)
Tag	CZM Capital Corp	104M 079, 80	Au, Ag	Epithermal Vein	DD (3429 m, 20 holes)
Terrace	Argonaut Resources Inc	103I 079	Au, Ag	Vein	DD (1156 m, 13 holes); IP

TABLE 1.2. CONTINUED

Property	Operator	MINFILE	Commodity	Deposit Type	Work Program
TJ Ridge	Roxgold Inc	093D 031	Au, Ag	Epithermal vein	DD (4880 m, 27 holes); 3D-IP; A; TR
Todd Creek	Intuitive Exploration Inc	104A 001	Cu, Au	Vein, Porphyry	DD (2582 m, 8 holes); IP; MG
Topley Richfield	NXA Inc.	093L 018	Au, Ag	Vein, VMS	DD (2706 m, 14 holes); IP; MG; GC
Trek	Romios Gold Resources Inc	104G 029	Au, Cu	Shear vein	DD (1410 m, 6 holes); AB-MG; AB-EM
Turnagain	Hard Creek Nickel Corp	104I 119, 120	Ni	Magmatic	DD (4105 m, 16 holes)
Virginia Silver	Megasilver Inc	093M 021	Ag	Vein	DD (1037 m, 6 holes); IP
Whiting Creek	Huckleberry Mine Ltd	093E 112	Cu, Mo	Porphyry	DD (2400 m, 7 holes)
Yellow Jacket	Prize Mining Corp	104N 043	Au	Orogenic Vein	PP (5000 tonnes)
Zymo	Canadian Gold Hunter Corp	093L 324	Cu, Au	Porphyry	DD (1554 m, 6 holes); IP; GC

Work Program Abbreviations:

A = access; trail, road construction on claims; AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totaling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping, etc; GC = geochemical sampling (rock, soil, silt, etc); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing-primarily for industrial mineral products; MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = Pilot plant, R = reclamation; RC = reverse circulation drilling; TR = trenching, UG (X m) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF;WT = washability test (coal)

was required for a large proportion of the ore due to high levels of mercury and arsenic. Ore was blended to suit the requirements of the Dowa and Noranda smelters, and to maximize payments to the mine. Throughout its life, careful determination of ore characteristics was required to separate smelter ore from milling ore. Four beat geologists and a senior mine geologist were on-site at all times. Cut-off grades were 12-15 g/t gold equivalent for mill ore and 30 g/t gold equivalent for smelter ore. Underground blast rounds containing more than one million dollars in gold and silver were common. Waste rock was trucked to Albino Lake where it was placed below water level to mitigate oxidation and prevent generation of acid run-off.

The Eskay Creek mine was approved by regulatory agencies in 1994 on behalf of Prime Resources Group Inc. A new 60 kilometre road was built from Highway 37 to access the mine site. Homestake Canada Inc acquired Prime Resources and developed the mine, at a nominal rate of 270 tonnes per day, with the first shipment of direct-to-smelter ore from the 21B zone being made in January 1995. Planning for an on-site mill started almost immediately and was permitted in 1996. It began commercial production on January 1, 1998 at 150 tonnes per day; the mill treated metallurgically simpler ore. This ore came primarily from the 109 footwall zone below 21B, and subsequently the NEX stratiform zone which was discovered in 1995. Mill tailings were handled in a similar fashion as waste rock, trucked 8 km to Albino Lake. The mine and milling rate increased incrementally over the next six years.

Figure 1.4. Eskay Creek Mine, geologist and miners at No. 1 Portal in 2003.

TABLE 1.3. ESKAY CREEK MINE PRODUCTION

Year	Gold Produced (oz)	Gold Produced (kg)	Silver Produced (kg)	Ore Tonnes Milled	Ore Tonnes shipped direct
1995	196 550	6113	309 480	0	100 470
1996	211 276	6570	375 000	0	102 395
1997	244 722	7612	367 000	0	110 191
1998	282 088	8774	364 638	55 690	91 660
1999	308 985	9934	422 627	71 867	102 853
2000	333 167	10 363	458 408	87 527	105 150
2001	320 784	9977	480 685	98 080	109 949
2002	358 718	11 157	552 487	116 013	116 581
2003	352 069	10 951	527 775	115 052	134 850
2004	283 738	8825	504 602	110 000	135 000
2005	190 221	5917	323 350	103 492	78 377
2006	106 880	3324	216 235	123 649	18 128
2007	68 000	2115	108 978	138 772	0
2008	15 430	480	27 800	31 750	0
TOTAL	**3 272 628**	**102 112**	**5 039 065**	**1 051 892**	**1 205 604**

Figure 1.5. Eskay Creek ore, sulphide – sulphosalt mineral layers in mudstone. Note small-scale offset on cleavage fractures.

A major improvement to mine infrastructure occurred in 2000 - 2001 when a 5 km tailings pipeline was built to Tom Mackay Lake. Homestake Mining Company merged with Barrick Gold Corporation in December 2001 and the mining rate increased yet again, this time to 670 tonnes per day. Several small ore bodies (21C, 21E, Hangingwall, Water Tower and 44 zones) extended the life of Eskay Creek. Currently, the site is undergoing reclamation on a seasonal basis. Portions of the camp buildings were sold to Sherwood Copper for its Minto mine in the Yukon. Some of the major equipment was sold but many smaller items were generously donated to Northwest communities. The mill and crusher buildings have been reduced to scrap and shipped off-site. By year-end the on-site work force was reduced to a rotating staff of 8 people supplemented by contractors when required.

The **Endako** open-pit molybdenum mine (MINFILE 093K 006) is operated by Thompson Creek Metals Company which owns 75% interest. Sojitz Corporation, a major Japanese-based molybdenum trading company, holds 25% interest. Molybdenum production for 2007 was 4292 tonnes from 9 808 000 tonnes of ore with an average grade of 0.060% molybdenum. The mill normally processes 28 000 tonnes per day. In 2007, recovery of molybdenum sulphide averaged 72.7% all of which was converted to molybdic oxide in the on-site roaster. In-situ and stockpile ore reserves are 292.8 million tonnes grading 0.050% molybdenum, with 128 million tonnes of waste rock. Employment near year-end 2008 totaled 299, plus 89 contractor employees who are installing a 3 km ore conveyor. Coupled with relocation of the in-pit crusher from the Endako pit to West Denak, the conveyor will transport ore to the mill more efficiently than trucks.

A mill expansion at Endako began on March 13 that will increase capacity from 28 000 to 50 000 tonnes of ore per day. The mill has been in operation since 1965 and the project will modernize the efficiency of processing. Included in the project is installation of a new grinding circuit with semi-autogenous grinding (SAG) and ball mills, a modern flotation circuit and an upgrade of the roaster circuit. However, the expansion project was put on hold on December 5 until the molybdenum price recovers.

Endako is a porphyry molybdenum deposit within the early Cretaceous Francois Lake granite batholith. Mineralization is related to an aplitic phase that intrudes an older coarse-grained variety. The orebody is a 3.5-kilometre long stockwork zone that is elongated to the west-northwest and dips about 50° south to a depth of 330 m. The hangingwall of the ore zone is delineated by

the South Basalt fault. Post-mineral cross faults segment the ore zone into three pits; the principal Endako pit, the smaller Denak pit and, furthest to the west, Denak West. In the long-term mine plan these will merge into a large 'superpit'. Mining was relocated to Denak West (Figure 1.6) near the end of 2007, following a large slide in the Endako pit. Ore from Denak West contains more molybdenum than expected, ore milled in early 2008 graded 0.08-0.09% molybdenum.

Exploration at the Endako Mine occurred in two zones and consisted of 18 drillholes totaling 3133 m. A westerly extension to the shallow dipping vein system in the Denak West pit was tested with 11 vertical drillholes. Southeast of the '#1 tailings pond' an expansion of the Casey Zone was explored with 7 drillholes.

The **Huckleberry** copper mine (MINFILE 093E 037) is operated by Huckleberry Mines Ltd. and is owned 50% by Imperial Metals Corp. and 32% by Mitsubishi Material Corp. The remaining 18% is shared equally among Dowa Mining Ltd., Furakawa Company Ltd. and Marubeni Corp. The mine is located 123 kilometres by road south of Houston at the foot of Huckleberry Mountain and employs 275 people including camp and trucking contractors. In 2007, the mill processed 6 477 600 tonnes of ore grading 0.442% Cu and 0.013% Mo. Copper recovery in 2007 averaged 87.4% but molybdenum recovery was just 16.3%. Copper concentrate is trucked to the port of Stewart for shipment to Japan and molybdenum concentrate is trucked to Vancouver. In 2008, ore was produced from the new Main zone extension (MZX) pit and copper production is forecast at 18 000 tonnes, 28% less than was produced in 2007. Mining in MZX is limited by proximity of the tailings impoundment and by waste rock back filled into the Main zone pit. A causeway of waste rock was constructed across the East pit to bulkhead the north wall failure that occurred in late 2007. In addition, a dam was built at its east end to accommodate tailings. Mine design work continued on a possible 13 million tonne expansion of the MZX pit into the Saddle zone between the Main and MZX pits. When the price of copper fell late in the year, Huckleberry continued to benefit from a forward sales agreement.

Huckleberry is a porphyry copper deposit related to the late Cretaceous Bulkley intrusions. In the Main zone, copper mineralization occurs in hornfelsed and fractured Hazelton Group volcanic rocks adjacent to a 500 metre diameter granodiorite stock. The arcuate ore zone is 150-200 m wide by 600 m long and rims the contact of the stock. The East zone is larger, measuring 150 m wide by one kilometre long, and is centred on a fault-controlled 40 m wide granodiorite dike that trends at 105°. Ore in both zones is a stockwork of quartz, pyrite and chalcopyrite, crosscut by gypsum-filled fractures. The Main and East zones are disrupted by the reactivated 105 Fault which resulted in 100 m of right lateral offset of ore. The Main Zone Extension is the faulted portion of the Main zone north of the 105 Fault. The East zone is also disrupted by a younger structure, the 150 Fault which resulted in 200 m of right lateral displacement. The Saddle zone lies between the Main zone and its northwest extension. Ability to mine this area will depend on the geotechnical characteristics of waste material (rock and tailings) in the Main zone pit, and by prevailing costs and copper price.

Figure 1.6. Endako Mine, Gordon Clark, Vice President and General Manager, oversees initial mining in Denak West pit.

Table Mountain gold mine (MINFILE 104P 070) remained closed in 2008. Hawthorne Gold Corporation acquired the mine and nearby Taurus gold deposit, now collectively named the Cassiar property. Gold at Cassiar occurs as free gold in a series of quartz-sulphide veins within a thrust-imbricated gently dipping sequence of serpentinite, basalt and argillite, an assemblage of oceanic crustal rocks. At Table Mountain, the sub-vertical quartz veins generally strike 070° and are developed in basalt on the west side of the Erickson normal fault. The veins dissipate in the overlying listwanite-altered serpentinite. The highest gold grade is found within 50 m of the base of a serpentinite body; the ore grades 15-30 g/t Au in situ. Veins have short strike extent, typically less than 100 m and generally do not penetrate into argillite above the serpentinite. Only one vein has been mined in the argillite from a nearly flat, bedding-parallel structure. The down-dropped east side of the Erickson fault is prospective for auriferous quartz veins but the area is difficult to explore due to barren argillite above the thrust fault. Production from the Main and Cusac underground workings and small open cuts on Table Mountain (1979-1988, 1993-95, 1998, 2007) totals 315 500 ounces (9815 kg) of gold. Placer mining in the Cassiar district recovered an estimated 74 500 ounces (2317 kg) of gold in the late 1800s, and streams are still worked on a small scale.

The geological setting at **Taurus** (MINFILE 104P 010, 11) is similar to Table Mountain but the erosional level of the quartz veins is deeper, approximately several hundred metres below the important serpentinite-listwanite cap. Gold grade of the quartz veins is generally less than 5 g/t. However, there are broad carbonate alteration zones around the veins, both conformable and

crosscutting, that contain about 1 g/t Au, associated with coarse pyrite and arsenopyrite. Past production from underground mining at Taurus is just 35 000 ounces (1089 kg) Au but there is a NI 43-101 compliant geological resource of 32.4 million tonnes grading 1.0 g/t Au that is under consideration for open pit mining.

Hawthorne Gold consolidated its ownership of the Cassiar gold camp by acquiring additional ground and by purchasing the interests of American Bonanza Gold Corp in the Taurus area for $2 million. Hawthorne undertook a comprehensive review of geological and survey data, and completed a 6355 line-kilometre airborne VLF-EM and magnetic survey to detect structures and alteration zones. Geological mapping was conducted over a nine kilometre interval of the prospective corridor between the Erickson and Beaton Creek faults. A diamond drilling program began to test targets in the Pete, Gap/Sky and Vollaug zones, to raise the resource category of the Taurus resource, and to validate reserves in the Bain vein. The previous mine owner calculated a probable reserve of 25 000 tonnes grading 17 g/t Au in the Bain vein. Drilling was curtailed and no results are available.

INDUSTRIAL MINERAL QUARRIES

Fireside barite quarry (MINFILE 094M 003) processed and sold 8000 tonnes of product in 2008. Plant feed was derived mainly from material mined in 2006 and stockpiled at the site, 125 km east of Watson Lake. A small amount of barite was mined by excavator from near the crusher. The quarry is owned by a private company, Fireside Minerals Ltd. of Red Deer Alberta. Fault-controlled barite veins are associated with gabbro dikes, of inferred Paleozoic age, emplaced into strata of the early Paleozoic North American continental shelf (*BCGS Geological Fieldwork – 2007, pages 219-225).*

Three jade properties were active in the Dease Lake and Cassiar areas; **Cassiar** (MINFILE 104P 005), **Polar Jade** (MINFILE 104I 083), and **Provencher Lake** (MINFILE 104I 073, 92). Nephrite jade formed at the contact between tectonically emplaced serpentinite and argillite within both Cache Creek and Slide Mountain oceanic terranes. The Polar site was mined by Jedway Enterprises under contract with the owner, Polar Gemstones Ltd. In-situ jade is normally produced at Polar Jade (Figure 1.7) but most of the 35 tonnes shipped in 2008 were culled from previously mined material. Excavation in the small Polar pit, and trenching and drilling nearby were all unsuccessful in locating jade of commercial quality. A large block of jade mined 8 years ago was carved into a piece named the Emperor's Sunrise, and was featured in the Canada Pavilion at the Beijing Olympic Games (Figure 1.8).

At Cassiar, jade is recovered from the waste dump of the Cassiar mine where it was discarded by previous operators. At Provencher Lake, jade boulders are entrained in glacial deposits. Cassiar Jade Contracting Ltd owns and operates the Cassiar site and also mined at Provencher Lake under contract with Glenpark Enterprises Ltd of Portland, Oregon. A 16.5 tonne boulder of exceptional quality was extracted from overburden at Provencher Lake and may rise to equal prominence as the Emperor's Sunrise.

The **Swamp Point** quarry (MINFILE 103O 017) was developed in 2007 by Ascot Resources Ltd to supply high-quality aggregate to California and other Pacific coastal markets. In 2008, Ascot carried out most of the site work necessary to install a ship-loader conveyor system designed to accommodate 'Panamax' size (70 000 dwt) vessels. Foundations, fuel storage and dispensing system, barge ramp and upgrade of the small craft dock and breakwater were largely completed (H. Smit, pers. comm., 2008). However, a sharp downturn in the U.S. housing industry caused Ascot to suspend erection of steel for the ship-loader. The site is now under care and maintenance.

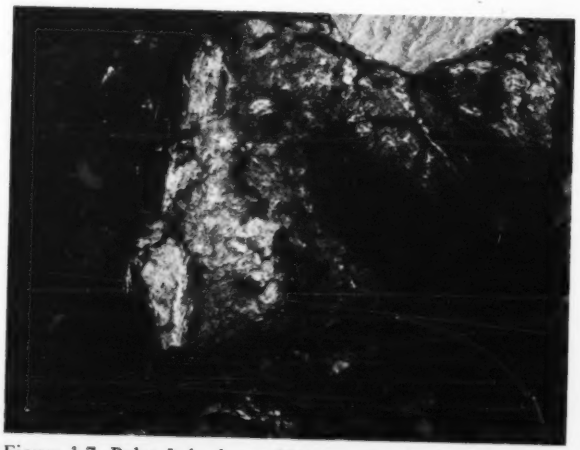


Figure 1.7. Polar Jade, lens of high-quality jade (light colour) bounded by serpentine (left) and sedimentary rocks (right).

Figure 1.8. 'Emperor's Sunrise' carved from Polar Jade, on exhibit at Beijing Olympic Games, 2008.

MINE DEVELOPMENT AND CONSTRUCTION

Tulsequah Chief and Ruby Creek deposits were under development in 2008, although activities at Ruby Creek were suspended on March 19th. A suspension of development continued at the Galore Creek copper-gold project but construction of the access road was reactivated. Development at Swamp Point was slowed and the site is now under care and maintenance. Similarly at Table Mountain, activities were curtailed. The start and subsequent postponement of the Endako expansion was noted in the preceding section. Despite this uneven pattern across the region, total development expenditure on these six projects, separate from exploration spending, is estimated at $245 million, down from $385 million spent on mine development and construction in 2007.

Redfern Resources Ltd continued development of the **Tulsequah Chief** copper-lead-zinc-gold-silver deposit (MINFILE 104K 002) as a 2000 tonne per day underground mine. It has a BC Environmental approval certificate and is acquiring permits required under the *Mines Act* and other legislation. Cost to build the mine is estimated at $201.5 million. Work in 2008 was financed in part by a future gold sales agreement with Gold Wheaton Corp in exchange for a $90 million advance payment.

A 1200 m airstrip was built on the flood plain of the Tulsequah River, near the mouth of Shazah Creek, to provide access for personnel and light supplies. A new 8 km road links the airstrip with the mine site, including a 42 m bridge across Shazah Creek. A new 12 km road was built to link the barge landing site near the Taku – Tulsequah confluence with the mine site (Figure 1.9). A spur road was pioneered to the Shazah tailings impoundment site, enabling detailed design work. Movement of heavy equipment and supplies via conventional barge from Juneau, Alaska was compromised by unusually low water levels in the Taku River. Redfern contracted construction of an air cushion barge (ACB) in Portland, Oregon that was forecast to be launched and tested in December 2008. Development of an amphibious tug boat to tow the ACB was cancelled and two shallow draft tugs are in use. Mill equipment and the 140-person permanent camp are being marshalled in Juneau. The first mining equipment is on site and removal of underground rail and old water and air pipe was completed on 5400 level in preparation for new trackless development.

The Tulsequah deposits are stratiform massive sulphide layers in a Devonian volcanic succession. The Tulsequah Chief deposit contains Probable Reserves of 5 378 788 tonnes at an average grade of 1.40% Cu, 1.20% Pb, 6.33% Zn, 2.59 g/t Au and 93.7 g/t Ag. The Big Bull deposit (MINFILE 104K 008) has an indicated resource of 211 000 tonnes at a grade of 0.40% Cu, 1.25% Pb, 3.33% Zn, 3.04 g/t Au and 161.7 g/t Ag, and an inferred resource of 669 000 tonnes at 0.35% Cu, 2.59% Pb, 5.97% Zn, 4.14 g/t Au and 194.8 g/t Ag. Big Bull is located about 2 km north of the barge landing site but does not figure into the current mine plan. Tulsequah operated as a tracked mine in the early 1950s but the new mine will be trackless. Most of the ore is located below valley elevation and will be accessed by a spiral ramp.

Figure 1.9. Tulsequah Chief Mine, new road will link the mine with a barge-landing site on the Taku River.

Adanac Molybdenum Corp began development of the **Ruby Creek** molybdenum deposit by upgrading the access trail from Surprise Lake to accommodate transportation of construction machinery and materials (Figure 1.10). The project is located 18 km east of Atlin. Construction was suspended on January 28 while the company worked to secure project financing and to complete necessary mine-layout details for a *Mines Act* permit. The permit was issued in June but Adanac was unable to arrange funding and in November Adanac announced that operations on the property are halted until further notice. The deposit has a measured and indicated resource of 212.9 million tonnes with a grade of 0.063% Mo, above a 0.04% Mo cut-off. Proven and probable reserves stand at 157 685 000 tonnes at an average grade of 0.058% Mo. An updated feasibility study reports a capital cost of $640 million to build the mine and 23 000 tonne per day mill.

The Ruby Creek deposit (MINFILE 104N 052) is a wide-spaced, coarse-grained molybdenite-quartz stockwork in a satellite intrusion of the Surprise Lake granite batholith. Molybdenite veins occur mainly in coarse-grained granite that is located above and peripheral to a flat-lying fine-grained sparse porphyry phase. (Previously described as quartz monzonite, the rocks are granite in composition, R. Pinsent, pers. comm., 2007). The tabular, 150 to 200-metre thick, molybdenum zone underlies the floor of the valley near the head of Ruby Creek. The mineral zone is thought to be controlled by three steeply dipping faults; the north-trending Boulder Creek fault, the east-northeast Adera fault and the northwest Ruby Mountain fault (R. Pinsent, pers. comm., 2007).

Figure 1.10. Ruby Creek, construction equipment parked on the new mine access road; tailings site in the distance.

Adanac completed 41 drillholes in 2008, part of a 60 hole program that began in 2007, in order to expand the resource in a down-dropped block north of the Adera fault. A grid pattern was drilled in the proposed pit with average spacing between drill collars of 15 m and an average depth of 370 m. Highlights from recent results include 219 m grading 0.09% molybdenum in hole AD-407 and 277 m grading 0.094% molybdenum in hole AD-422.

MINERAL EXPLORATION

Total exploration spending in the Northwest Region for 2008 is estimated at $140 million. Figure 1.11 shows the distribution of expenditure; grassroots 1%, early stage 29%, advanced stage 37%, mine evaluation 27% and mine property 6%.

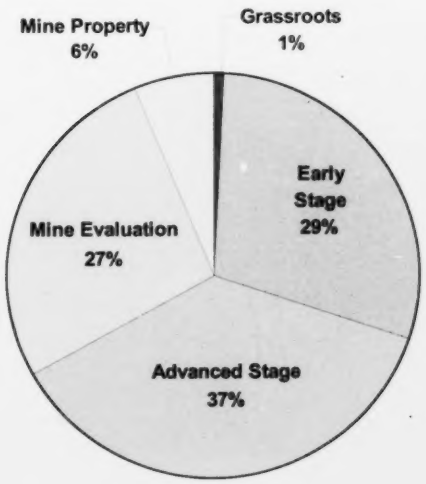


Figure 1.11. Distribution of total exploration spending in the Northwest Region.

Grassroots is the search for an exploration target. It spans pre-tenure activities such as literature research and airborne surveys to on-ground work (perhaps on mineral tenure) such as prospecting, silt and rock sampling and, in some instances, drilling for geological information. Grassroots work is commonly confidential and secretive; it is certainly not all captured by our survey.

'Early stage' exploration is the initial work conducted on a target, usually based on a deposit model. It comprises focused geological mapping, soil geochemical and geophysical surveys, generally on a grid, trenching and drilling. A property may remain in 'early stage' for more than one campaign of drilling if new areas are tested.

'Advanced stage' exploration concerns the delineation of a mineral resource. The main activity is regularly spaced drilling. Other activities may be undertaken but are subordinate to resource definition drilling; baseline environmental and access surveys, bench-scale metallurgical study and exploration of satellite or secondary targets. An economic scoping or pre-feasibility study is commonly undertaken.

'Mine evaluation' is concerned with the environmental, social, engineering and financial evaluation of a mining project. The first two components are synonymous with fulfilling requirements of the BC and Canada Environmental Assessment Acts; engineering and financial evaluations are addressed by the project proponent's full-scale feasibility study which cannot be completed accurately until the environmental and social terms are set. Social evaluation includes consideration of First Nations; negotiation of an impact and benefits agreement. Resource drilling may continue but the focus of site activity is on hydrology, geotechnical assessment of pit walls and tailings impoundment, selection of plant site and bulk sample metallurgical testing. Environmental studies include wildlife and stream-water quality and quantity.

'Mine property' exploration refers to work done at an operating or developing mine on new mineral zones outside existing ore reserves. Drilling programs at the operating Endako mine and at the (briefly) under construction Ruby Creek mine are in this category.

Figure 1.12 shows spending distribution by mineral deposit type; porphyry copper (copper-gold and copper-molybdenum projects) 50%, gold and silver in vein-type deposits 20%, porphyry molybdenum 18%, polymetallic massive sulphide deposits 9%, magmatic nickel 2% and coal 1%.

MINE EVALUATION PROJECTS

Mine evaluation projects are shown in Figure 1.1 together with major and small operating mines and mining projects in development. Important infrastructure is also presented.

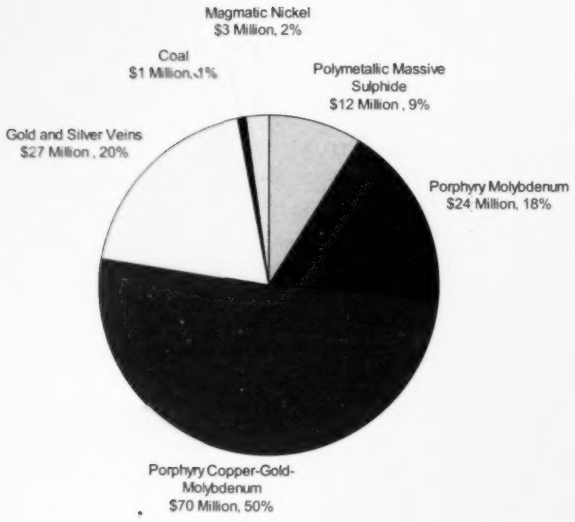


Figure 1.12. Spending distribution by mineral deposit type.

Galore Creek Mining Corp, a 50-50 partnership between Teck and NovaGold Resources, carried out studies related to re-engineering of the Galore Creek project (MINFILE 104G 090). Construction began in 2007, but was suspended late in the year due to unanticipated cost over-runs. Key elements of the 2008 program were; core drilling to provide better acid-base assessment of waste rock in the pit high-wall, geotechnical drilling of an alternative tailings site in West More Creek valley and investigation of a new alignment for the access tunnel. Pit waste rock that can be characterized as non-acid generating will not require subaqueous disposal, thereby reducing the height of a tailings impoundment. The West More site, near Round Lake (Figure 1.13), receives much less precipitation than Galore Creek valley and will not require large and costly diversion structures to accommodate high run-off volumes. The portal for the tunnel on the access road is now planned to be at Kilometre 91. Tunnel length is increased to 12 km but eliminates a 10 km section of road in Sphaler canyon that would be very costly to build and of high risk during operations. The overall length of the access route is reduced to 106 km from 130 km.

Galore Creek measured and indicated resources total 785.7 million tonnes grading 0.52% Cu, 0.29 g/t Au and 4.87 g/t Ag. Inferred resources, which include the nearby **Copper Canyon** deposit, stand at 522.5 million tonnes at 0.35% Cu, 0.29 g/t Au and 4.79 g/t Ag.

At **Schaft Creek,** Copper Fox Metals Inc. employed up to 90 people to acquire information for environmental assessment of a proposed 100 000 tonne per day open pit copper mine. The property is located 30 km north of the Galore Creek access road at the 65 km mark. One large pit would encompass three closely adjacent zones; the principal Liard (Main) zone, the small relatively high grade West Breccia zone and the northerly Paramount zone. Work focused on geotechnical drilling of the pit margins (the northeast high wall in particular) and at the Skeeter valley tailings impoundment east of the deposit. New mineralization was encountered by drilling east of the Paramount zone (Figure 1.14). An IP survey was completed over the plant site to detect mineralization that might be alienated by development. Test samples of all waste rock lithologies were established to monitor generation of acid run-off.

Schaft Creek (MINFILE 104G 015) is a large porphyry copper deposit that also contains molybdenum, gold and silver. Measured and indicated resources, at a 0.20% Cu equivalent cut-off, are 1.393 billion tonnes grading 0.25% Cu, 0.019% Mo and 0.18 g/t Au and 1.55 g/t Ag. The measured and indicated open pit resource is estimated to be 812 million tonnes at a grade of 0.30% Cu, 0.020% Mo, 0.21 g/t Au and 1.8 g/t Ag. The deposit occurs in volcanic rocks adjacent to the same Triassic batholith with which the Galore Creek deposit is associated, though not with an alkalic phase. However, the deposit shares some characteristics with the Galore Creek copper-gold deposits that are unusual among porphyry deposits; copper grade contours are sub-horizontal and quartz is largely absent as a stockwork mineral. Another attribute of Schaft Creek is that the order of abundance of ore minerals is chalcopyrite, pyrite, bornite, molybdenite. This is both significant and unusual. In most porphyry copper deposits pyrite is much more abundant than copper minerals contributing to risk of acid rock drainage.

The **KSM (Kerr-Sulphurets-Mitchell)** gold-copper project entered the BC Environmental Assessment process. Seabridge Gold Inc. contemplate a 120 000 tonne per day open pit mine at the large porphyry copper

Figure 1.13. Galore Creek, Paul Cocklin (Construction Manager) and Jay Fredericks (EMPR) overlook Round Lake from the Galore Creek access road. Proposed tailings site in the distance.

Figure 1.14. Schaft Creek, geologists examine drill core.

Figure 1.15. KSM, Mitchell zone, marked by the gossan, is truncated by the paired Mitchell and Sulphurets thrust faults.

deposit. The site is 40 km north of Stewart and 18 km southeast of Eskay Creek mine (Figure 1.15). Key to the development is the Mitchell zone (MINFILE 104B 176, 275) that continues to be delineated; 30 core holes (17 000 m) were completed in 2008 to upgrade and expand the resource. The company began environmental and engineering studies for a 23 km tunnel and conveyor that would transport ore easterly to a proposed plant and tailings site near the head of Teigen Creek, 10 km south of Highway 37 near Bell II. The development vision includes mining the Kerr and Sulphurets deposits (MINFILE 104B 191, 182). Mineral resources in the three deposits, based on work up to the end of 2007 are tabled below.

Indicated Resources

Zone	Tonnes (000)	Gold (g/t)	Copper (%)
Mitchell	734 163	0.69	0.18
Kerr	206 272	0.25	0.45
Sulphurets	74 655	0.75	0.24
Total	1 015 090	0.61	0.24

Inferred Resources

Zone	Tonnes (000)	Gold (g/t)	Copper (%)
Mitchell	667 421	0.62	0.15
Kerr	51 387	0.21	0.45
Sulphurets	33 636	0.62	0.20
Total	752 444	0.59	0.18

Work by Seabridge shows the Mitchell porphyry system is inclined 45° north with its southerly surface expression truncated by the southeast-directed Mitchell thrust fault. Movement on the Mitchell and closely overlying Sulphurets thrust faults occurred in late Cretaceous time. Gold occurs with chalcopyrite and pyrite in a quartz stockwork. Uniformity of copper and gold grade throughout the deposit is an important characteristic. The Mitchell zone quartz stockwork is strongly deformed (Figure 1.16) and hostrocks are a monotonous sequence of chlorite-sericite schist. Deformation is less intense at depth (M. Savell, pers. comm. 2008), but a distinction is obscure between possible progenitor lithologies; Mitchell intrusions or volcanic rocks of either the Stuhini or Hazelton groups. Likewise, ore-related hydrothermal alteration is obscured by post-mineral deformation, although M. Savell states that highest copper grade is associated with potassium feldspar and magnetite toward the west end and at depth in the deposit (pers. comm., 2008). Furthermore, sericite and molybdenite are more prevalent to the east and topographically higher in the mineral zone. This pattern extends to the molybdenite-bearing gold zone at Snowfield (refer to *Exploration and Mining in British Columbia 2007 (EMBC 2007)*, page 14).

In 2008, Sherwood Copper Corporation completed its acquisition of Western Keltic Mines Inc whose principal asset was the **Kutcho Creek** copper-zinc project located 100 km east of Dease Lake. Kutcho Creek is a volcanogenic massive sulphide deposit (MINFILE 104I 060). Three elongate sulphide lenses (Main, Sumac and Esso West) are arranged en echelon over a strike length of 3.5 km within schistose felsic volcanic rocks of early Triassic age. Measured and indicated resources in the three deposits total 17 690 703 tonnes grading 1.71% Cu, 2.36% Zn, 27.5 g/t Ag and 0.34 g/t Au. The inferred resource is estimated at 11 858 639 tonnes at 1.00% Cu, 1.58% Zn, 15.6 g/t Ag and 0.17 g/t Au.

Sherwood Copper undertook an in-fill drilling program in the Main zone with holes spaced 25 m apart on 60 m section lines, aimed at proving continuity of high grade areas close to surface. Drilling amounted to 9900 m in 81 core holes. The company anticipates both an increase in metal grade and an upgrade in classification of the resource; in addition, the drill core will provide

Figure 1.16. KSM – Mitchell zone, a clast of deformed quartz stockwork in a fault breccia.

Figure 1.17. Kutcho Creek, Jay Fredericks (EMPR) and Dani Alldrick (Sherwood Copper geologist) view surface trace of the ore zone and the proposed tailings site.

material for detailed metallurgical testing. Sherwood Copper advised the Envirnomental Assessment Office (EAO) of several changes to proposed mine development, including a decrease in milling rate to 4000 tonnes per day and a switch to dry-stacked disposition of tailings (Figure 1.17). In September, Sherwood Copper and Capstone Copper Corporation announced plans to merge the two companies. The new entity aims to submit a Project Report to the EAO in the first half of 2009.

Fortune Minerals Limited updated its feasibility study of the **Mount Klappan** anthracite coal project and retained CIBC World Markets to solicit a partner to develop the property. The feasibility analysis determined a strong rate of return; a higher coal price ($150 per tonne) used in the study offsets an escalation in capital cost to $617 million for a 3 million tonne per year mine. The study focused on truck transportation via a proposed new 100 km road linking the property to Highway 37 and on to Stewart, as a lower cost alternative to a buried slurry pipeline or a railway extension.

The Klappan-Groundhog coalfield is in the northern Bowser Basin, a mid to late Jurassic marine basin filled with clastic sediments that culminated in a deltaic environment including coal measures. Anthracite is a premium coal with the highest rank, carbon and energy content, coupled with the lowest moisture and volatile content of all coals. It can be used in a wide variety of specialty applications including water purification, briquettes, as a metallurgical reductant in steel manufacture, and as an ultra-low volatile PCI coal (pulverized coal injection). Coal resources at Mount Klappan (MINFILE 104H 020-22) occur in four deposits that contain 107.9 million tonnes classified as measured, 123 million tonnes as indicated and 2.572 billion tonnes classified as inferred and speculative. These are compliant with current Securities Commission standards.

The **Davidson** molybdenum project (MINFILE 093L 110) is located 10 km west of Smithers and is owned by Blue Pearl Mining, a wholly-owned subsidiary of Thompson Creek Metals Company. The company proposes to develop an underground mine at Davidson and ship high grade molybdenum ore to Endako Mine for processing. This development is linked with the proposed new mill at Endako which would have a separate circuit to treat Davidson ore. A feasibility study estimated that a 2000 tonne per day mill would require capital expenditures of $109 million to develop the project; $65.7 million for underground development and $43.3 million for surface infrastructure. Underground development would be a new 3 km adit at the base of Hudson Bay Mountain to be used as a haulage ramp. Surface infrastructure would consist of a water treatment plant, access roads, onsite buildings and ore-handling facilities. The Project Report was accepted by EAO on September 3. The quality and quantity of water emanating from the mine is a primary concern to nearby residents. Blue Pearl announced in November that the project is on hold due to the decline in molybdenum price; the company will continue the Environmental Assessment permitting process.

The Davidson molybdenum deposit is related to a blind late Cretaceous intrusive complex beneath Hudson Bay Mountain. The intrusive complex produced a hornfels zone in Hazelton Group volcanic rocks. The principal molybdenum ore zone determined to be 75.3 million tonnes grading 0.177% Mo is situated 300 m above a quartz porphyry plug and is connected to a smaller ore zone within the quartz porphyry in a stacked arrangement. The preferred hostrock for the upper (principal) zone is a granodiorite sill of inferred Jurassic age. The top of the quartz porphyry is characterized by crenulated quartz layers popularly referred to as 'brain rock' but more properly known as unidirectional solidification texture. Below the lower molybdenum zone, the quartz porphyry plug is cut by a granite to quartz

monzonite stock, possibly a Nanika intrusion. The deposit represents a complex history of cross-cutting relationships with at least three molybdenum mineralizing events including fine-grained molybdenite veins, banded quartz-molybdenite veins and molybdenite blades and rosettes in pegmatite.

Pacific Booker Minerals Inc. continued to advance the **Morrison** copper-gold project. A program of geotechnical and hydrogeology drilling and test-pitting was completed. Metal leaching and acid generation test work continued and environmental field work was completed. The company continued to try to engage the Lake Babine First Nation. Morrison (MINFILE 093M 007) is a porphyry copper deposit with a measured plus indicated resource of 206 869 000 tonnes grading 0.39% Cu, 0.20 g/t Au and 0.005% Mo. The inferred resource stands at 56 524 000 tonnes grading 0.40% Cu, 0.21 g/t Au and 0.005% Mo. The company proposes to develop a 30 000 tonnes per day open pit mine.

GRASSROOTS, EARLY AND ADVANCED EXPLORATION

PORPHYRY COPPER PROJECTS

Porphyry copper projects comprise copper-gold and copper-molybdenum projects. Few projects contain all three metals in economically significant amounts. Projects that exceeded $500,000 expenditure are displayed in Figure 1.18. The map also shows, with a separate symbol, several deposits with significant resources that had a lower level of expenditure or were inactive. These may represent opportunities for new partners.

Prospects in the Iskut-Stikine district are all, except for one, developed in late Triassic to early Jurassic igneous rocks within Stikine terrane prior to its accretion to North America. Pre-accretion porphyry prospects are primarily copper-gold projects; molybdenum is significant only at Schaft Creek. Only the Eaglehead copper-molybdenum prospect occurs in a post-accretion intrusion. Galore Creek, Red Chris and Schaft Creek projects are described in the preceding section on Mine Evaluation Projects. The intrusions are sub-alkalic, potassium-rich and of intermediate composition, typically monzonite and their volcanic equivalent. K-feldspar porphyritic rocks are common. Alkalic rocks, syenite and pseudoleucite-bearing trachyte that characterize the Galore Creek deposit, represent an end-member composition. Some of the copper-gold deposits in the Stikine district have a high gold to copper ratio, i.e. greater than 1 g/t gold for 1% copper. Depending on metal recoveries and relative prices, gold may be more important than copper so that some can be referred to as porphyry gold-copper projects.

Porphyry copper-molybdenum prospects predominate in the Skeena district. Some copper-gold prospects occur but gold content is appreciably less than in the Iskut-Stikine district. Skeena district porphyry prospects are all contained in post-accretion intrusions comprising the extensive late Cretaceous Bulkley, and more localized Eocene Nanika and Babine calc-alkaline intrusions. The three suites have separate distribution patterns but all occur within a transverse geologic feature known as the Skeena Arch. Bulkley and Babine intrusions are generally intermediate in composition; medium to coarse granodiorite is typical of the Bulkley suite and biotite-feldspar porphyry is characteristic of the Babine suite. Nanika intrusions contain more quartz and potassium feldspar, and comprise pink granite and quartz porphyry rhyolite dikes. The Huckleberry deposit is related to a Bulkley intrusion. The Morrison deposit is in a Babine stock. Both projects are described in preceding sections.

ISKUT-STIKINE DISTRICT

The **Eaglehead** porphyry copper prospect (MINFILE 104I 008) 50 km east of Dease Lake was drilled by Carmax Explorations Ltd. Copper-molybdenum mineralization is developed in a pink, biotite-hornblende granodiorite for a 10 km distance along the Thibert fault, a regional terrane-bounding structure. Fourteen holes were completed, testing IP anomalies in the Bornite, East and Far East zones. Results were not available.

Turnagain is a bulk-tonnage nickel prospect in a zoned ultramafic complex, located 70 kilometres east of Dease Lake and owned by Hard Creek Nickel Corporation. It is the only nickel project in the region and is grouped with porphyry copper projects only for the convenience of this report. Nickel occurs as disseminated pyrrhotite with minor pentlandite and rare chalcopyrite in the Horsetrail zone (MINFILE 104I 119). Forty of the 75 holes drilled in 2007 were reported in early 2008. The new data led to a revised measured plus indicated resource estimate totaling 576 million tonnes at a grade of 0.162% nickel sulphide and an inferred resource of 545 million tonnes at 0.154% nickel sulphide. Determination of sulphide nickel is based on selective leach analyses; total nickel content is about 0.22%. Fourteen core holes were completed in 2008, in-fill holes in the Horsetrail zone and to investigate platinum-palladium content of the Cliff zone. Ore grinding and nickel flotation test work was undertaken on the 4-tonne bulk sample extracted in 2007. A flat hole was drilled as a pilot hole for an adit that may be excavated to obtain a larger bulk sample. Hard Creek began to collect site environmental and hydrologic data, and signed a cooperation agreement with the Dease River Band and the Kaska Dena Council that contemplates negotiation of a socio-economic participation agreement that will be completed as part of a feasibility study.

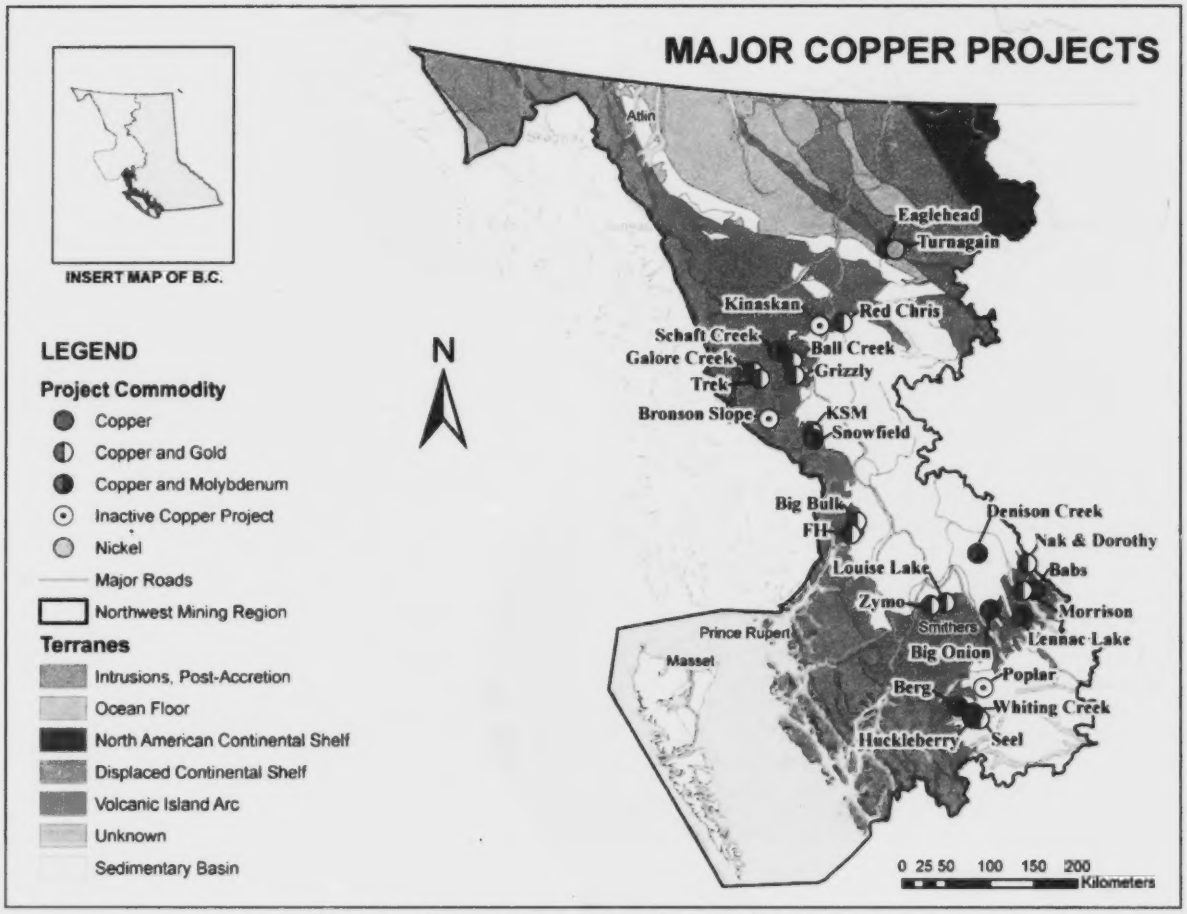


Figure 1.18. Major porphyry copper projects, Northwest Region.

At the **Red Chris** copper-gold property, 80 km south of Dease Lake, Imperial Metals Corporation constructed a 17 km access road to enable transportation of equipment for deep drilling and year-round operation. In 2007, a hole in the core of the East zone intersected 1024.1 metres grading 1.01% Cu, 1.26 g/t Au and 3.92 g/t Ag and bottomed in strong mineralization. In 2008 the first follow-up hole was completed to a depth of 1300 m and a series of wedge offsets will be drilled in 2009 (Figure 1.19).

Red Chris (MINFILE 104H 005) is a porphyry copper-gold deposit developed in an early Jurassic monzonite stock emplaced very near the fault-controlled north margin of the Bowser Basin. Measured plus indicated resources in the Main and East zones, estimated in 2004, are 446.1 million tonnes grading 0.36% Cu and 0.29 g/t Au, at a cut-off grade of 0.2% Cu. The inferred resource in the Main and East zones is 268.7 million tonnes grading 0.30% Cu and 0.27 g/t Au. There is an additional inferred resource in the Far West and Gully zones of 116.0 million tonnes grading 0.32% Cu and 0.30 g/t Au, also at a 0.2% Cu cut-off. The Red Chris project was awarded a BC Environmental Assessment Certificate in 2005. Federal approval under the Canadian Environmental Assessment Act was revoked in 2006 but, in 2008, the Federal Court of Appeal overruled the earlier trial court decision, thereby upholding the federal process and reinstating the federal environmental certificate.

Silver Standard Resources Inc. devoted its drill program on the **Snowfield** property to exploring east of the boundary of the KSM property owned by Seabridge Gold, in particular east of the Mitchell zone. Thirty-one holes were completed, totaling 16 945 m which outlined a gold-copper zone 700 by 800 m in surface extent that was named Snowfield North (Figure 1.20). Width and grade are comparable to the Mitchell zone, but mineralization is developed best 500 m east of the mutual boundary. Mitchell and Snowfield North are likely continuous geologically but separated by a lower grade interval. Drill-hole MZ-20 near the centre of Snowfield North intersected 662 m with an average grade of 0.86 g/t Au and 0.18% Cu. Silver Standard determined that Snowfield North is continuous with the Snowfields gold zone (MINFILE 104B 179) located 500 m to the south and at higher elevation (Figure 1.21). It was delineated during the past two seasons and contains a measured plus indicated resource of 78.57 million tonnes grading 1.21

Figure 1.19. Red Chris, Boyles 56-model drill, capable of drilling to 1500 m.

Figure 1.20. Snowfield, Silver Standard and EMPR geologists review drill core; Iron Cap gold-copper zone in the distance.

Figure 1.21. Snowfield, view of the Snowfield gold-molybdenum zone and the upper camp; Snowfield North is at lower elevation, beneath the fog.

g/t Au above a cut-off of 0.5 g/t gold. This occurs in a flat, near-surface zone. The inferred resource is 14.3 million tonnes at a slightly lower grade.

Canadian Gold Hunter Corporation disclosed a revised resource estimate for its **Kinaskan** (GJ) property 25 km southwest of Iskut. The measured and indicated resource in the Donnelly and North Donnelly copper-gold zones (MINFILE 104G 086) is 153.3 million tonnes grading 0.321% Cu and 0.369 g/t Au, at a cut-off of 0.2% Cu. At the same cut-off the inferred resource is 23.0 million tonnes grading 0.260% Cu and 0.310 g/t Au. No field work was conducted in 2008; geology of the prospect is described in *EMBC 2007*, pages 14-15.

A private company, Pembrook Mining Corporation drilled two holes on the **Ball Creek** porphyry copper prospect 10 km west of Highway 37, north of Bob Quinn. Geology and mineralization of the Mary (MINFILE 104G 018) and DM zones are described in *EMBC 2007*, page 15. John Bradford (pers. comm., 2008) reported BC08-01 intersected 0.16% Cu and 0.41 g/t Au over 265 m, beginning 33 m below surface.

On the **Grizzly** property near the Galore Creek access road, Rimfire Minerals Corporation explored an alkalic copper-gold system (MINFILE 104G 079) with a comprehensive program of geology, soil geochemistry, induced polarization and drilling (Figure 1.22). The principal target is a chalcopyrite-bearing zone exposed in a steep drainage, bounded by a fault on one side and by an orthoclase porphyritic dike on the other (Figure 1.23). Hostrocks are volcanic and volcaniclastic sedimentary rocks correlated with the Stuhini Group; the former contain 20-30% potassium-feldspar and small sparse hexagonal crystals, possibly pseudoleucite. Pseudoleucite occurs in volcanic rock at Galore Creek and indicates an alkaline composition. Results of the 11-hole, 2127 m program were not available at time of writing.

Romios Gold Resources Inc reported discovery of a copper-gold breccia zone on the **Trek** property, located at Kilometre 92 of the Galore Creek access route. A late Triassic intrusion at Trek (MINFILE 104G 029) is controlled by a northeast fault that corresponds to a prominent deflection in the course of Sphaler Creek. Romios carried out an airborne geophysical survey and drilled 6 holes (1410 m). The first hole, angled steeply southwest, returned 0.61% Cu and 0.39 g/t Au over 131.4 m. The second hole, drilled vertically from the same site, cut 0.10% Cu and 0.51 g/t Au over 315 m. The property was not visited.

Durango Capital Corporation acquired mineral claims over much of a 20 by 30 km area in the Kitsault district, 50 km southeast of Stewart. In 2008, Durango explored the **Big Bulk** prospect (MINFILE 103B 016) near Kinskuch Lake, including the nearby Seabee (MINFILE 103B 014) and Midnight Blue areas. In 2003, Canadian Empire Exploration Corp intersected significant copper-gold mineralization on the property but did no follow-up (see *EMBC 2007*, page 11). Durango performed a deep-

Figure 1.22. Grizzly property, soil samplers Joe McCreery and Mike Drennan-Young.

penetration induced polarization survey prior to drilling eight holes at Big Bulk, two at Seabee and two at Midnight Blue. Results at Big Bulk demonstrate widespread sub-economic copper and gold grades, such as 152.4 m interval in hole BB-11 grading 0.17% Cu and 0.06 g/t Au. On the **FH** property, 15 km south of Big Bulk and 5 km north of Kitsault, Durango Capital explored the San Diego zone (MINFILE 103P 155) copper-gold target with a 4-hole, 1200 m program (Figure 1.24). The zone had not previously been tested by drilling.

SKEENA DISTRICT

Terrane Metals Corporation continued in-fill drilling on the **Berg** porphyry copper-molybdenum prospect (MINFILE 093E 046) located 84 km southwest of Houston and 22 km northwest of Huckleberry mine. Mineralization occurs in a Nanika quartz monzonite stock as an annular zone around a barren core (Figure 1.25). Work in 2007 resulted in an updated resource estimate; 372.5 million tonnes indicated at a grade of 0.31% Cu, 0.036% Mo and 2.1 g/t Ag, and 140.9 million tonnes inferred at a grade of 0.25% Cu, 0.039% Mo and 2.2 g/t Ag. The estimates include a near-surface zone of supergene mineralization. Important findings of the 2007 program were recognition of a molybdenum-rich core to the annular ore zone, and local areas of significant silver content. These were investigated further by drilling in 2008 of 11 661 m in 31 holes. Berg is a classic porphyry copper system; alteration comprises potassium feldspar and secondary biotite in the stock, biotite hornfels in the country rocks, and a peripheral sericite zone.

Huckleberry Mines Ltd, a subsidiary of Imperial Metals Corp, drilled seven holes (1400 m) on the **Whiting Creek** prospect (MINFILE 093E 112). The property was not visited; no results are available.

Gold Reach Resources Ltd. completed a winter drill program at the **Seel** prospect (MINFILE 093E 105) that totaled 4407 m in 21 holes and focused on the Seel breccia zone. The property is 110 km south of Houston, and just 7 km from Huckleberry copper mine. The Seel breccia is about 200 m in diameter with higher grade copper-gold-silver mineralization occurring on its flank. The breccia plunges steeply toward the nearby copper-gold zone developed in a Bulkley intrusion. Seel property resources contained in three zones were determined to be 13.9 million tonnes indicated, grading 0.30% Cu, 0.30 g/t Au and 0.007% Mo, and 12.9 million tonnes inferred, grading 0.20% Cu, 0.11 g/t Au and 0.019% Mo. A 0.3% Cu equivalent cut-off grade was used. The adjoining Ox Lake deposit, drilled by Gold Reach in 2007, was determined to contain an inferred resource of 16.1 million tonnes at a grade of 0.30% Cu and 0.04% Mo.

The **Big Onion** porphyry copper prospect (MINFILE 093L 124) is 16 km east of Smithers and contains a historic resource of 94 million tonnes grading 0.42% Cu. Eagle Peak Resources, a private company, drilled early in the year (11 holes, 2350 m), the culmination of a major program that began in 2007. Mineralization is developed in a composite quartz diorite and quartz-feldspar porphyry intrusion, tentatively assigned to the early Tertiary Nanika suite. The mineralized zone was expanded and additional drilling is proposed but a new resource estimate is not available.

Figure 1.23. Grizzly property, Rimfire geologist Mike Roberts examines the Grizzly copper-gold showing.

Figure 1.24. FH property, a difficult drill set-up on the San Diego zone.

Figure 1.25. Berg drill camp, situated on the barren core of the copper-molybdenum deposit; the ore zone underlies the recessive area and the hornfels zone is on the skyline.

On the **Zymo** property (MINFILE 093L 324) located 45 km west of Smithers, Canadian Gold Hunter received encouraging results from drilling the Hobbes zone discovered in 2007 (Figure 1.26). The Hobbes zone is 3 km west of the area drilled by Freeport McMoRan in 1999 (refer to *EMBC 1999*, page 59-64). Drill targets were derived from a 60 km soil geochemical survey and a 45 km induced polarization survey. All six holes (1554 m total) intersected wide intervals of quartz-chalcopyrite stockwork veins. Drill-hole ZY-08-09 assayed 0.32% Cu and 0.23 g/t Au over its full core length of 253 m. Mineralization is developed in diorite, associated with potassium feldspar, biotite and magnetite, and in adjacent sericite-altered sedimentary rocks. The diorite is one of several similar bodies that lie within a 2 by 4 km magnetic anomaly, and are interpreted to be apophyses of a single intrusion.

North American Gem Inc. conducted another winter drilling campaign at the **Louise Lake** porphyry prospect (MINFILE 093L 079) west of Smithers. Sixteen holes (5043 m) were completed. Geological mapping of the property and a soil geochemical survey were carried out in the summer. Resources are estimated at 6 million tonnes (indicated) at 0.214% Cu, 0.006% Mo and 0.20 g/t Au and 141 million tonnes (inferred) at 0.234% Cu, 0.009% Mo and 0.23 g/t Au. The Louise Lake deposit has an unusual mineralogy – copper occurs as fine grained chalcopyrite and enargite – and unusual geometry, occurring as a 170 m thick, gently-dipping tabular body.

At the **Lennac Lake** porphyry copper property (MINFILE 093L 190, 191) 45 km east of Smithers, Dentonia Resources Ltd completed five drillholes in January, the conclusion of a program that began in late 2007 (see *EMBC 2007,* pages 16-17). The holes tested the Southeast zone, one to two kilometres from areas explored in the 1970s. The best hole, -LL08-16, intersected 62 m grading 0.037% Mo and 0.067% Cu.

The **Nak** (MINFILE 093M 010) and nearby **Dorothy** (MINFILE 093M 009) porphyry copper prospects in the Babine district, 85 km northeast of Smithers, were explored by Copper Ridge Explorations Inc. Both prospects are underlain by biotite-feldspar porphyry stocks of the Babine suite. Similar intrusions are associated with porphyry copper deposits at past-producing Bell and Granisle mines. Copper Ridge completed an 85 km IP survey that was started late in 2007, and followed up by drilling five holes totaling 1265 m. Results were not available.

Figure 1.26. Zymo, Geologist Bob Johnston on the discovery outcrop, a chalcopyrite-bearing quartz stockwork.

Also in the Babine district, Kenrich Eskay Mining Corp reactivated exploration of the **Babs** property (MINFILE 093L 325) located 70 km east of Smithers. Several previous operators searched without success for the source of copper-bearing biotite feldspar porphyry (Babine suite) boulders in glacial till. Past drilling encountered copper mineralization in Babine suite eruptive rocks (see *EMBC 2007*, pages 117-121). Kenrich Eskay conducted trenching (Figure 1.27), collected soil samples over a 57.5 km grid for mobile metal ion (MMI) analyses and drilled 1048 m in 7 core holes. The holes intersected felsic lapilli tuff with disseminated and veinlet chalcopyrite. Hole 08-2 returned 0.16% Cu over 59.6 m and hole 08-6 contained 0.21% Cu over 76.4 m. Derivation of the mineralized intrusive boulders remains elusive.

Figure 1.27. Babs, three geologists prospect newly exposed copper mineralization 30 metres away from the excavator.

PORPHYRY MOLYBDENUM PROJECTS

Porphyry molybdenum projects are displayed on Figure 1.28. Molybdenum prospects occur in Cretaceous to Tertiary age intrusions in Northwest BC. These intrusions post-date terrane accretion and therefore molybdenum prospects may be present anywhere in the region. However, there are two distinct areas of concentration, the Skeena Arch and in the Atlin-Cassiar area. Skeena Arch molybdenum deposits are found in a number of intrusive suites: the early Tertiary Alice Arm and Nanika intrusions, late Cretaceous Bulkley intrusions and the Jurassic Francois Lake batholith. In the Atlin-Cassiar area, molybdenum occurs mainly in late Cretaceous batholiths, the Surprise Lake and Cassiar batholiths in particular but also in Tertiary intrusions. In both regions, molybdenum mineralization found in granite batholiths is preferentially associated with a fine-grained border or high-level phase and usually forms a laterally extensive, tabular deposit. Examples are Endako mine, Ruby Creek, Storie and the new Shan prospect. Molybdenum mineralization associated with small, highly silicic intrusions occurs in a quartz stockwork above the intrusion or as a vertical annular zone around it. Examples include the Davidson, Lucky Ship, Red Bird and Alice Arm deposits including Kitsault. Three deposits; Endako, Ruby Creek and Davidson are described in previous sections of this report.

ATLIN-CASSIAR DISTRICT

Exploration at the **Titan** molybdenum deposit (MINFILE 104M 089), located 40 km west-southwest of Atlin, was carried out by XO Gold Corp. The property is underlain by the Coast Plutonic Complex. Mineralization is located near the contact between a Tertiary granite and older metamorphic rocks as well as disseminations in the intrusion. Field work included an airborne geophysical survey over 650 line kilometres, geological mapping, prospecting and soil geochemistry.

The Swan molybdenum-tungsten porphyry (MINFILE 104O 010) is held by Hastings Resources Corp and is located approximately 90 km west of Cassiar. Mineralization is hosted by phases of the Glundebery batholith. Molybdenum is controlled by northwest trending fracture sets and occurs as coarse molybdenite grains in quartz and arsenopyrite-magnetite-pyrite-quartz veins. The 2008 work program included 1000 m of drilling in 13 holes (Figures 1.29, 1.30).

Velocity Minerals Ltd. conducted a drill program on its **Haskins** property, located near Cassiar (MINFILE 104P 059). The molybdenum zone is situated on the northwest slope of Haskins Mountain in lower Paleozoic Atan Group chert and limestone near the contact with an Eocene granite stock. The sequence of hornfels and skarn zones progressing toward the stock is biotite hornfels, actinolite-chlorite hornfels, garnet-diopside skarn and marble, and, next to the stock, magnetite-pyrrhotite skarn (V. Strimbu, pers. comm., 2008). A quartz-molybdenite stockwork is developed best in chert-skarn with abundant actinolite-chlorite veins. Quartz veins are both planar and highly crenulated. Velocity Minerals drilled 13 holes with total length 3427 m (Figure 1.31) to bring a historic resource of 12.3 million tonnes grading 0.094% Mo into compliance with current standards.

Columbia Yukon Resources Inc. continued to drill the **Storie** deposit (MINFILE 104P 069) near Cassiar to upgrade the molybdenum resource. A large program was conducted with 20 700 m of drilling in 49 holes. An important outcome of the program was wide molybdenum intersections up to 450 m west of the resource area. A new resource estimate based on 2007 drilling upgrades the deposit size to an indicated 98.3 million tonnes grading 0.064% Mo and an inferred 30.9 million tonnes grading 0.059% Mo. This is anticipated to be significantly increased due to the westerly extension of molybdenum zone. Molybdenite mineralization is located in the Cassiar batholith near the eastern border and forms a flat

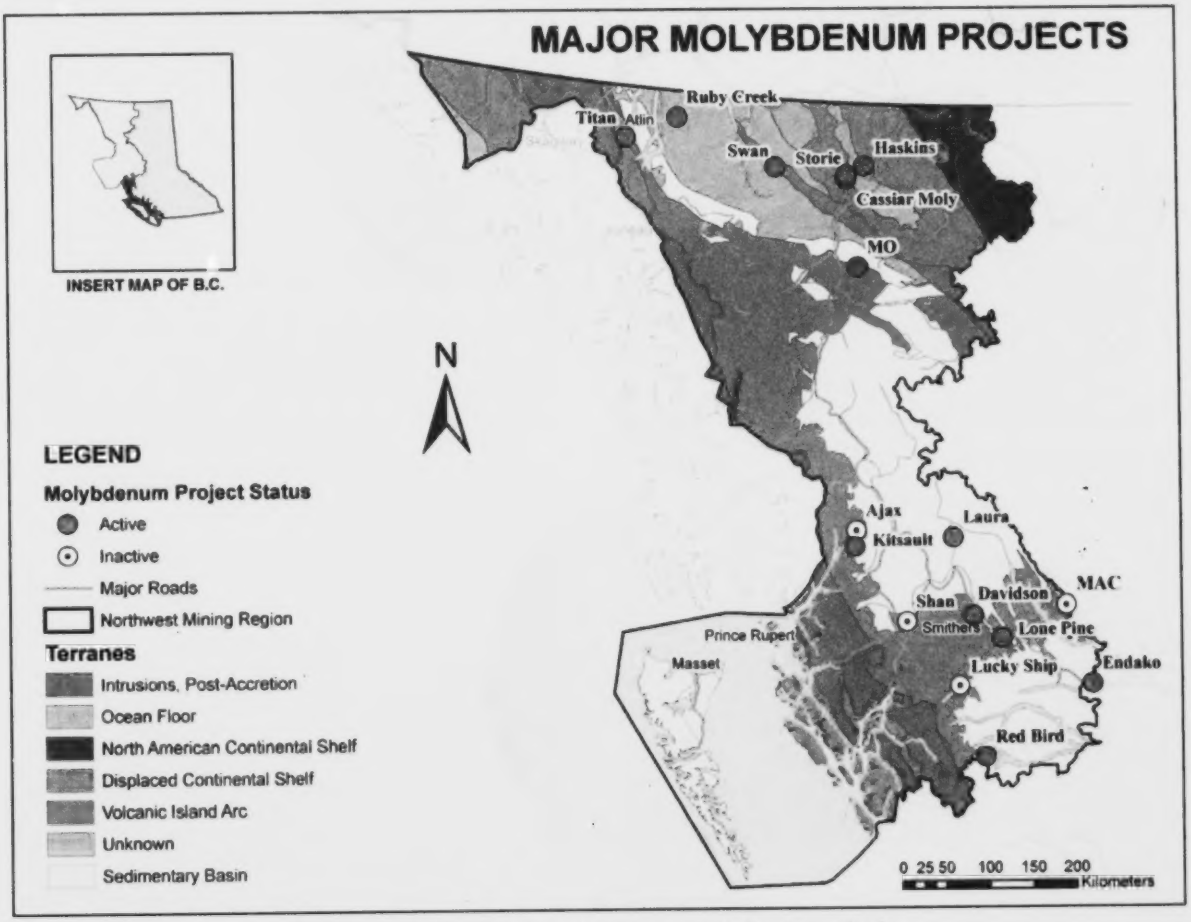


Figure 1.28. Major porphyry molybdenum projects, Northwest Region.

lying, 150-200 metre thick zone. Four sub-horizontal phases are recognized (M. Jerema, pers. comm., 2008), all are quartz monzonite to granite in composition; an uppermost megacrystic unit, a fine-grained (quenched) unit, medium to coarse grained phase and a lower quartz-feldspar porphyry. Quartz-feldspar porphyry, possibly the youngest phase, contains the highest molybdenite content. Metallurgical testing determined a concentrate grade of 53% Mo and "locked cycle testing" showed molybdenum recoveries of 70% to 87%.

The **Cassiar Moly** deposit (MINFILE 104P 035) is located approximately 5 km south of Cassiar in an eastern phase of the Cassiar batholith. An adit, 970 m long, was excavated in 1968-1969 by Value Line Minerals Ltd to evaluate continuity of a surface showing discovered by John Hope in 1966. (John Hope, pers. comm., 2008). Historic sampling of the showing returned 0.28% Mo over 3.6 m and 3.6% Mo over 1.5 m. Velocity Resources Ltd. restored the portal, located at an elevation of 1890 m, for underground access and rehabilitated the access trail to the portal (Figure 1.32).

Paget Moly Corp drilled 8 holes (2148 m) on the **MO** property (MINFILE 104I 059) located 30 km southeast of Dease Lake, within the Snowdrift Creek pluton. Exploration for a porphyry system was conducted by Kennco and BHP Utah Mines in 1973-76, without success. Work by Paget Moly confirmed an RGS (regional geochemical survey) silt anomaly from Snowdrift Creek, at 280 ppm Mo, it is one of the highest RGS values in BC. Initial drillholes targeted areas of high magnetic response, as did the unsuccessful holes by Utah Mines, but subsequent holes tested a magnetic low and found a quartz-molybdenite stockwork (Figure 1.33).

SKEENA DISTRICT

The **Kitsault** property (MINFILE 103P 120) is located about 140 km north of Prince Rupert and was acquired by Avanti Mining Corp. in June 2008 for a purchase price of $20 million. The high grade molybdenum mine operated between 1967 and 1972 and from 1981 to 1982 with a total production of 13 600 tonnes of molybdenum.

Figure 1.29. Swan, Clive Aspinall supervised the drill program.

Figure 1.31. Haskins Mountain, site geologist Vlad Strimbu reviews drill core.

Figure 1.30. Swan, a porphyritic phase of the Glundebery batholith in drill core, with prominent potassium feldspar.

Figure 1.32. Cassiar Moly, access trail and exploration adit were re-opened.

A resource estimate from historical drill assays concluded that at a 0.04% cut-off grade there is an indicated resource of 158 million tonnes grading 0.100 % Mo and an additional inferred 133 million tonnes grading 0.080% Mo. Avanti released a preliminary economic assessment and is currently working toward completion of a formal prefeasibility study that will include a resource update and further examination of pit and site details.

A drill program comprising 33 holes and 10 127 m, collared within the open-pit (Figure 1.34), targeted an annular zone of molybdenum mineralization associated with the multiphase Lime Creek quartz monzonite to quartz diorite stock that cuts Bowser Lake Group sedimentary rocks. Molybdenite veins occur in the stock and in the contact metamorphic aureole. Preliminary drill results show no significant differences with the resource model and could improve it to the north. The program also provided for metallurgical testing, the geotechnical evaluation of pit wall slope angles and to measure acid generation potential.

Paget Moly Corp. carried out exploration on the **Laura** molybdenum prospect (MINFILE 093M 079) completing 1858 m in 8 drillholes (Figure 1.35). Mineralization occurs within a biotite granodiorite stock, one of the Bulkley intrusions, located 32 km north of Hazelton. Four episodes of veining are evident, molybdenite occurs in the two intermediate vein sets with pyrite, chalcopyrite, pyrrhotite and secondary biotite. Bowser Lake Group sedimentary rocks are fractured but a less receptive hostrock.

The **Shan** property (MINFILE 103I 114), located 20 km northeast of Terrace, experienced a reduced level of activity from the 2007 field season. Mineralization occurs in the Carpenter Creek granitic pluton, part of the Coast Plutonic Complex, which intrudes and underlies Hazelton Group volcanic rocks. BCM Resources Ltd conducted

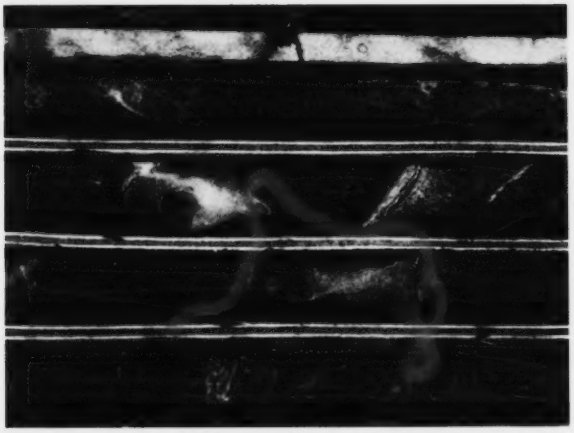


Figure 1.33. MO property, quartz-molybdenite veins with pink K-feldspar envelopes.

Figure 1.34. Kitsault, Dan Munter (project manager) in the open pit of the past-producing molybdenum mine.

geological mapping to test an interpreted fault offset of the Las Margaritas molybdenum zone. A purple mineral previously considered to be fluorite was identified to be anhydrite. Geology and mineralization at Shan are described in greater detail by Venable and Wojdak (*Geological Fieldwork 2008*).

Bard Ventures Ltd further outlined the Alaskite molybdenum zone on the **Lone Pine** project (MINFILE 093L 027, 28) located 15 km north-northwest of Houston. A total of 25 holes were drilled into the zone. An additional 2 holes were completed in the nearby Granby Zone and 5 holes in the Quartz Breccia zone for a total of 18 793 m of core drilling. In the Alaskite zone, the mineralized intrusion dips steeply to the southwest toward a quartz-feldspar porphyry tentatively correlated with the Nanika intrusions. Adjacent Telkwa Formation andesite is extensively hornfelsed, fractured and veined but contains less molybdenite than the alaskite (Figure 1.36). Drilling has delineated the alaskite body over 510 m in length, 310 m in width and to a depth of 843 m. Significant drill intercepts from hole BD-08-25 include 731 m grading 0.10% Mo (200 m estimated true thickness) and 130 m grading 0.20% Mo. Release of a resource estimate is anticipated.

Located 65 km southwest of Houston, the **Lucky Ship** property (MINFILE 093L 053) had a decreased level of activity compared to the large drill program conducted in 2007. Nanika Resources Inc, previously named New Cantech Ventures, announced an indicated resource estimate of 65.66 million tonnes grading 0.064% Mo and an inferred resource of 10.24 million tonnes grading 0.054% Mo at a cut-off grade of 0.03%. The Lucky Ship molybdenum-bearing stock belongs to the Nanika suite of intrusions and cuts Telkwa Formation volcanic rocks, part of the Hazelton Group.

Torch River Resources Ltd. completed 16 core holes (5000 m) on the **Red Bird** molybdenum prospect, which is located 125 km south of Houston (MINFILE 093E 026). Based on work prior to the 2007 field season, the indicated resource is estimated to be 43.3 million tonnes at a grade of 0.064% Mo. An additional 70.5 million tonnes is inferred grading 0.058% Mo. The resource is distributed in three zones, Main, Southwest and Southeast, which occur around the margin of an Eocene quartz monzonite stock that intruded Telkwa Formation tuffs. Torch River investigated rhenium content; a sample with 0.137% Mo returned 0.128 ppm Re, in the high end of the range typical of porphyry molybdenum deposits.

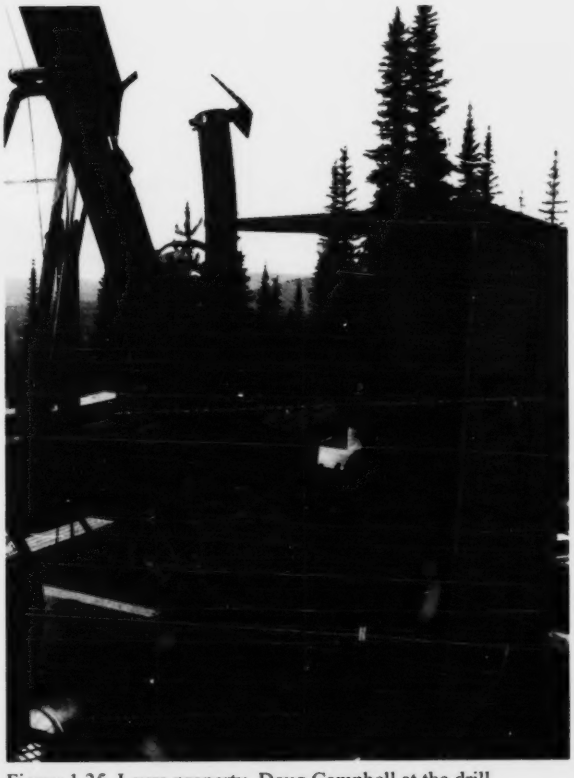


Figure 1.35. Laura property, Doug Campbell at the drill.

Figure 1.36. Lone Pine, quartz-molybdenite vein in the Alaskite zone.

POLYMETALLIC MASSIVE SULPHIDE PROJECTS

Polymetallic massive sulphide projects are shown in Figure 1.37. These are all volcanic-hosted. Sediment-hosted massive sulphide deposits occur in strata of the North American continental shelf and are not well represented in Northwest region. Volcanic hosted massive sulphide projects span a wide age range. Tulsequah Chief, Joss'alun, Highway, Foremore and Aspira are all in Paleozoic strata but of different terrane affiliation. The Kutcho Creek deposit is in rocks of Triassic age. Projects in the Stewart area, including Eskay Creek, are all in Jurassic volcanic rocks of Stikine terrane. Finally, BQ and Suskwa occur in a Cretaceous-age overlap assemblage. Eskay Creek mine, Tulsequah Chief and Kutcho Creek projects are described in previous sections of this report.

The **Highway** property is located in the Big Salmon metamorphic complex near the Alaska Highway and is operated by Strategic Metals Inc. The Paleozoic rocks north of the B.C. - Yukon border are known to contain volcanogenic mineralization. A single drillhole (213 m) determined that an electromagnetic anomaly is derived from buried river gravel. Exploration of the nearby Tes claims (MINFILE 104N 135) was deferred.

The **Joss'alun** project (MINFILE 104N 136) was explored by Lomiko Metals Inc under option from Copper Ridge Exploration Inc. The property is located approximately 75 km southeast of Atlin. Copper mineralization occurs as conformable lenses of chalcopyrite and pyrite within mafic volcanic and volcaniclastic rocks of the Nakina Formation, Cache Creek Group. One hole to test for an extension of the Joss'alun zone intersected 0.66% Cu over 3.1 m. Two holes targeted an IP and soil geochemical anomaly at the Box Lake showing but did not intersect significant copper.

On the **Foremore** project (MINFILE 104G 148), stratibound copper-zinc-silver-gold sulphide mineralization occurs within Stikine Assemblage mafic to felsic flows and sedimentary rocks. Roca Mines Inc optioned the property, located 30 km east of the Galore Creek project, from Lorne Warren in 2000 to search for the source of high-grade boulders in glacial moraine. Roca was successful in locating new showings which continue to be evaluated. Work completed in 2008 included a ground induced polarization survey and 15 drillholes totaling 1520 m. No drill results were available.

Kenrich-Eskay Mining Corp. completed 4 drillholes with an accumulative length of 2333 m on the **SIB** claims (104B 376). Eskay-type, gold-silver rich massive sulphide mineralization is situated in a succession of Eskay Rift rhyolite and mudstone that is directly correlative with the Eskay Creek deposit. Deep holes were designed to test a fault-offset of the Lulu Zone below the Coulter Creek thrust. Mineralization was intersected at depth in altered rhyolite, including 25.4 m grading 2.1 g/t Au, 0.2% Zn and 0.1% Pb in drillhole EK08-134.

Kenrich-Eskay Mining Corporation continued to explore the **Corey** property (MINFILE 104B 240, 387) for an Eskay Creek-type deposit. Corey is located 12 km south of Eskay Creek mine and also covers directly correlative stratigraphy. Drilling recommenced in the Red Lightning zone to outline stratibound and disseminated pyrite-pyrrhotite-chalcopyrite mineralization that occurs in an altered mafic volcanic unit of the Hazelton Group. The zone was tested with 7 drillholes (1750 m in total). Intercepts of base metal massive sulphides include 20.4 m (estimated true thickness of 10.8 m) grading 0.79% Cu, 0.42% Ni and 0.8 g/t Au in hole CR08-86.

The **Todd Creek** claims, located in the Stewart district, are underlain by a series of prominent gossans in the glacially-scoured valley of Todd Creek (Figure 1.38). Mineral showings include Mylonite, South (MINFILE 104A 001), Yellow Bowl (104A 111), Knob (104A 109), Fall Creek (104A 107), North (104A 105, 106) and Amarillo (104A 104). These showings comprise characteristics of epithermal vein and polymetallic massive sulphide deposits. A volcanogenic massive sulphide deposit is the target sought by Intuitive Exploration Inc. Coarse chalcopyrite occurs in fine grained quartz-jasper veins in the South zone (Figure 1.39). At a new showing, massive pyrite-chalcopyrite-sphalerite-galena is underlain by volcanic breccia, with clasts to 40 cm, and overlain by massive andesite (Figure 1.40). The zone extends about 700 m. (D. Molloy, pers. comm., 2008). Work in 2008 comprised 6.2 line kilometres of induced polarization surveying, 66 line kilometres of magnetic surveying and 8 diamond drillholes totaling 2582 m.

The **Barbara Anne** (or **BA**, MINFILE 104A 178) project of Mountain Boy Minerals Ltd. is located 30 km northeast of Stewart. A sequence of well-bedded massive pyrite, iron-rich mudstone, chert and jasper is associated

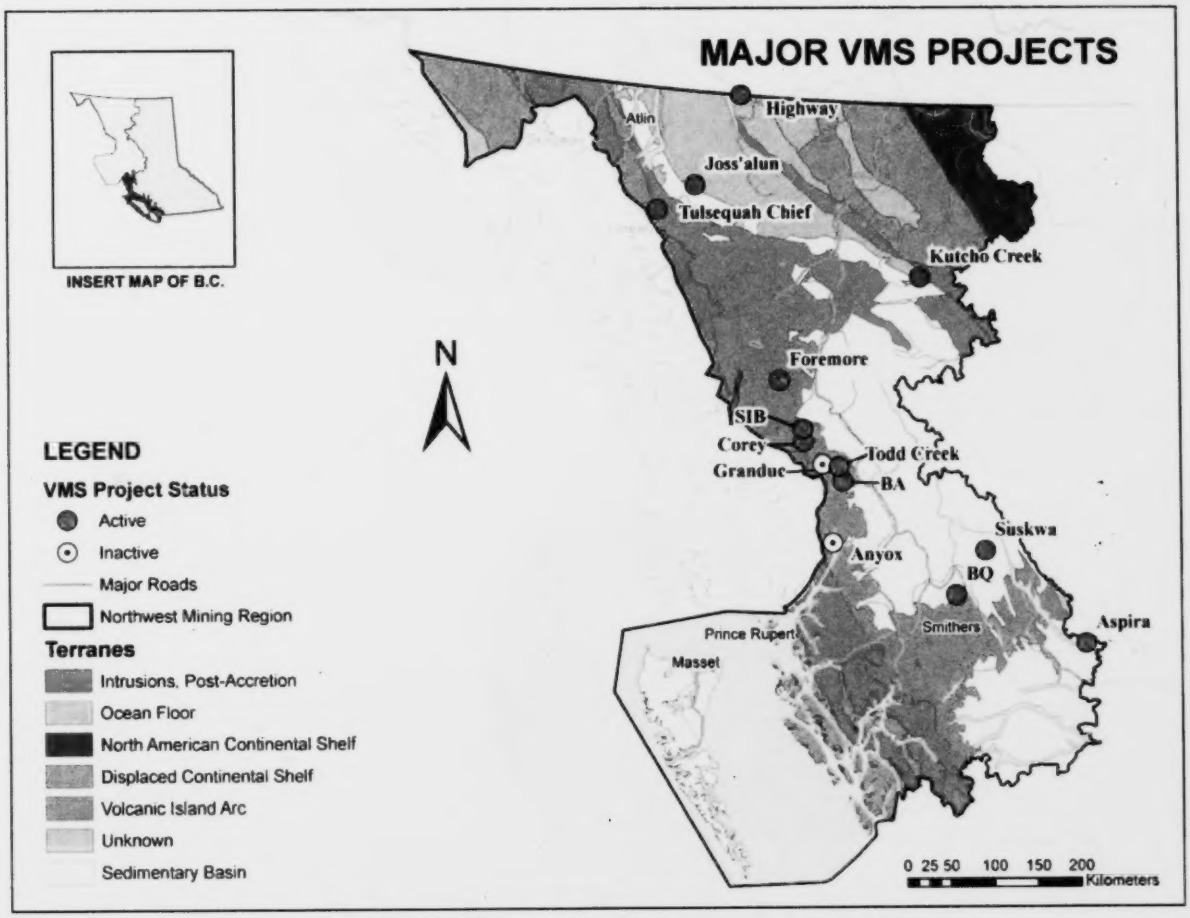


Figure 1.37. Polymetallic massive sulphide deposits, Northwest Region.

with spheroidal rhyolite in Hazelton Group strata. Silver, lead and zinc mineralization is associated with replacement-style barite and hematite alteration. Twenty-two drillholes were completed over an area measuring 800 m in strike extent by 400 m downdip. A highlight from holes drilled in 2007 was a 19.82 m intercept grading 146.81 g/t Ag, 1.16% Pb and 2.56% Zn. All holes drilled in 2008 remain to be reported.

Otterburn Ventures Inc. explored the **Suskwa** project that covers the Max (MINFILE 093M 027) and Knoll (MINFILE 093M 100) showings located 34 km east of Hazelton. Work focused on the Max prospect and involved 60 line kilometres of soil sampling, prospecting, cleaning trenches and completion of a 43-101 technical report. Geological mapping and prospecting linked silver and gold-bearing veins with a felsic volcanic horizon. A volcanogenic massive sulphide deposit setting is described on the nearby Knoll showing in *EMBC 1999*, page 79-84.

Endurance Gold Corp. followed up geophysical and geochemical surveys conducted in 2007 on the **BQ** property with four drillholes (625 m). The claims are located 50 km northwest of Smithers. Drilling encountered little mineralization, chargeability anomalies are considered to be derived from graphitic argillite horizons observed in drill core. Endurance Gold terminated its option to acquire a 100% interest in BQ.

Figure 1.38. Todd Creek, drilling on the Knob zone, one in a series of strong gossans.

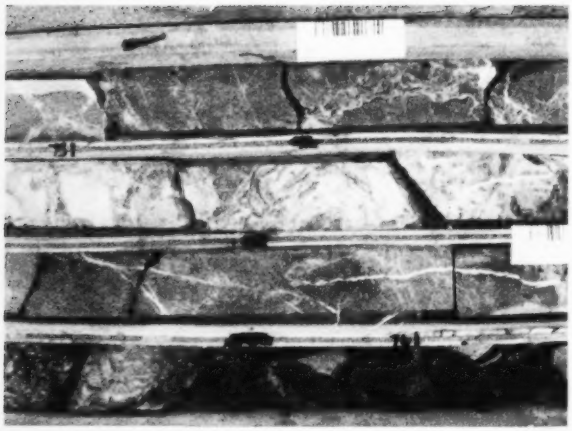


Figure 1.39. Todd Creek, South zone core with banded quartz-jasper vein network.

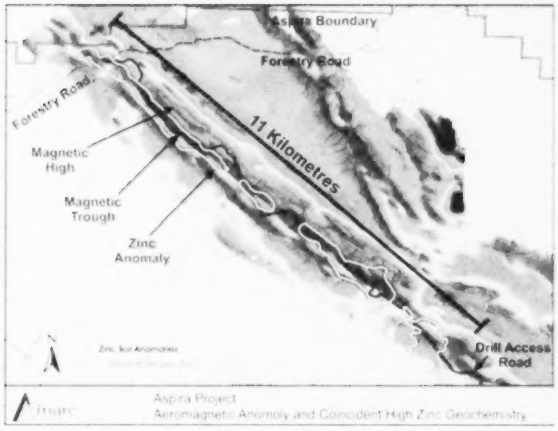


Figure 1.41. Aspira, map showing aeromagnetic anomaly and coincident high zinc soil geochemistry (from Amarc website).

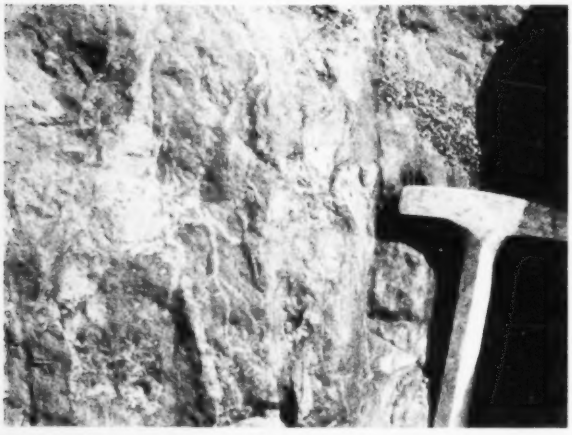


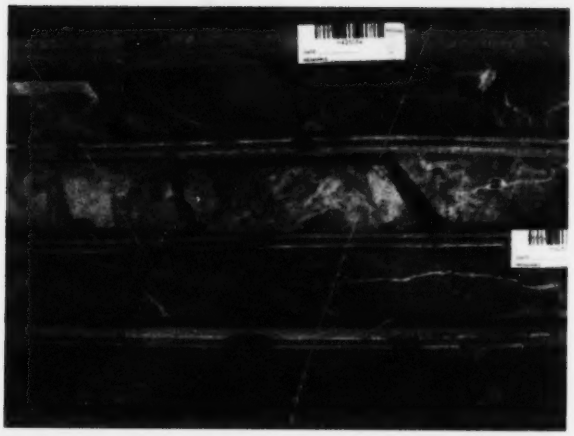
Figure 1.40. Todd Creek, stratabound massive pyrite-chalcopyrite-sphalerite at the VMS showing.

Figure 1.42. Aspira, wispy disseminated pyrite (and sphalerite) in mafic meta-volcanic rock.

Amarc Resources Ltd. explored the **Aspira** property (MINFILE 093K 052) 40 km northeast of Burns Lake. The property is underlain by deformed volcanic and sedimentary rocks of the Sitlika Assemblage. In 2007, a soil survey generated a strong zinc anomaly, values up to 8500 ppm, in association with mafic to felsic volcanic rocks. Follow-up in 2008 comprised an aeromagnetic survey, a major soil survey (5184 samples), 37 line kilometres of induced polarization and 11 drillholes (2343 m). A 15 km road was built for drill access. The zinc anomaly extends for 11 km in a north-northwest direction and is associated with a high magnetic signature (Figure 1.41). The drillholes encountered pyrite and trace amounts of sphalerite, chalcopyrite and galena as fine laminations in volcanic and sedimentary rocks (Figure 1.42). No economic values were encountered.

GOLD – SILVER PROJECTS

The gold-silver projects shown in Figure 1.43 comprise epithermal to mesothermal veins, orogenic and intrusion-related veins. Gold-silver projects occur in various geologic terranes but are concentrated in the 'Golden Triangle' (or Stewart district) of Stikine terrane and in the Atlin area where they occur in Cache Creek terrane and near the terrane-bounding Llewellyn fault. In the Skeena district, silver accompanies gold or is the dominant metal at many projects. The following descriptions proceed roughly from north to south.



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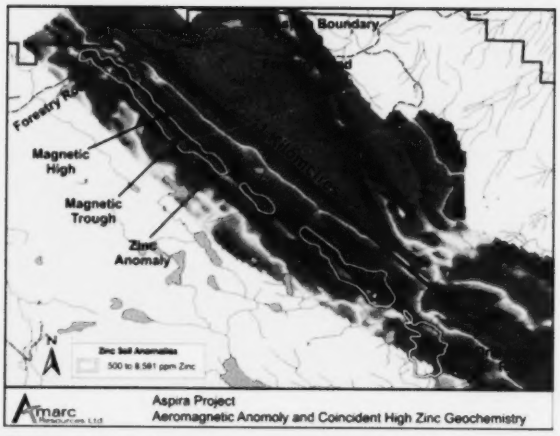

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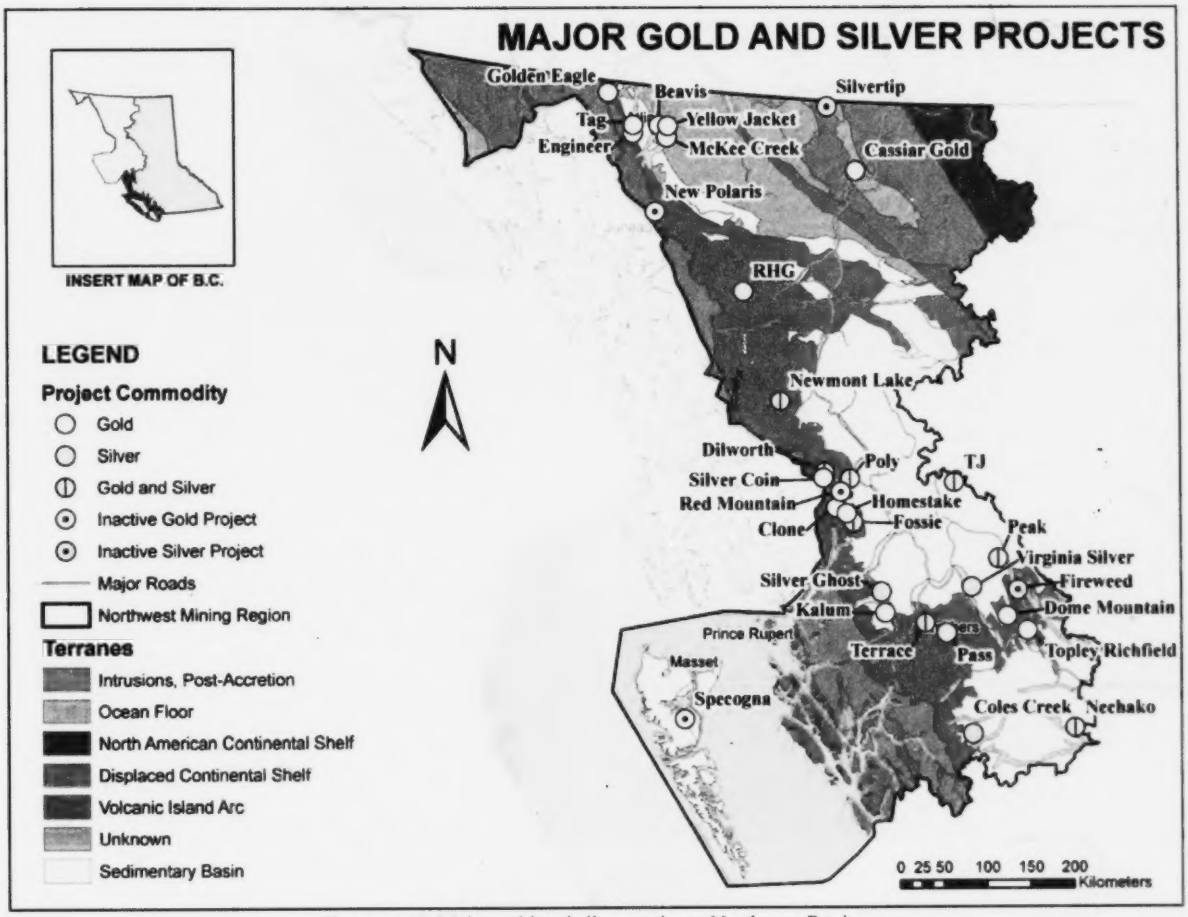

Figure. 1.43. Major gold and silver projects, Northwest Region.

ATLIN DISTRICT

Troymet Exploration Corp. contracted Equity Exploration Consultants Ltd. to complete an exploration program focused on the Tannis zone of the **Golden Eagle** project (MINFILE 104M 044, 74). The property is located approximately 50 km northwest of Atlin and is near a major structure, the Llewellyn fault. Drilling in 2006 (Figure 1.44) intersected gold-bearing quartz-arsenopyrite veins developed in a body of rhyolite, of assumed Tertiary age, and intersected up to 10.7 g/t Au and 104.2 g/t Ag over 5.5 m. In 2008, a total of 2406 m were drilled in 12 holes. The arsenopyrite-gold vein system was found to extend downward into porphyritic and miarolytic biotite granite, likely related to the overlying rhyolite.

Saturn Minerals Inc. explored orogenic gold veins on the historic **Beavis** mine (MINFILE 104N 007) located 2 km north of the town of Atlin. The mine was developed on three levels from one shaft with a depth of 60 m between 1902 and 1908. The gold target is situated in a compressional tectonic belt of oceanic crustal rocks overprinted by listwanite alteration. Gold mineralization is entrained in the Monarch Mountain thrust near the contact between serpentinite, volcanic rocks, chert and argillite, all part of the Cache Creek terrane. Gold, locally high grade, is associated with quartz veins in zones of listwanite alteration in ultramafic rocks. Results were not available for the 8 holes (855 m) that were drilled.

Yellow Jacket (MINFILE 104N 043) contains coarse gold mineralization related to the tectonic emplacement of ultramafic rocks of the oceanic Cache Creek terrane. A 10 000 tonne bulk sample was mined in 2007 and approximately 5000 tonnes were milled in 2008. Rich placer gold overlies the property, in the heart of the Atlin placer district. Prize Mining Corp used a ball mill to increase throughput of material into a Knelson-designed gravity processing plant (Figure 1.45). Three gold bars with a combined weight of 547 ounces were produced on site, and a quantity of concentrate was shipped off-site for final recovery of gold. Prize Mining may expand the operation to mill an additional 40 000 tonnes in 2009. A semi-autogenous grinding mill is at the site which, when installed, will enable more efficient processing of ore.

McKee Creek, also in the Atlin placer district, is located 15 km southwest of the town of Atlin (MINFILE 104N 035) in a similar geologic setting as Yellow Jacket and Beavis. Saturn Minerals Inc drilled four holes (694 m) and intersected chert and argillite cut by banded and vug-lined quartz veins (Figure 1.46). Drill results were not available.

CZM Capital Corp. drilled 20 core holes (3429 m) to test epithermal gold-silver mineralization on the **Tag** property (MINFILE 104M 079, 80) located on the Taku Arm of Tagish Lake 35 km west of Atlin. The 025 fault is a northeast splay off the regional-scale Llewellyn fault. Banded and vuggy quartz with sparse pyrite fill open space in a fault breccia developed in Laberge Group greywacke. A highlight of the first phase of drilling is an interval from TAG08-60 that graded 2.33 g/t Au and 6.93 g/t Ag over 22.1 m.

The historic **Engineer** mine (MINFILE 104M 014) is located on the southeast side of Tagish Lake, 32 km west-southwest of Atlin. Focus of the BC Gold Corp. exploration program was shear zone "A" which was tested by seven holes totaling 1825 m (Figure 1.47). Underground sampling was conducted and samples of drill core were analyzed with a hand-held unit that detects alteration minerals (PIMA). Structural mapping was completed underground and on surface to determine displacement along the A and B shears and locate the extension of the Engineer vein. Gold-bearing veins are related to tensional fractures associated with motion along the Llewellyn fault (F. Devine, pers. comm., 2008). Drill intercepts indicate the A shear is approximately 60 m wide, broader than previously thought. Map interpretation indicates that a likely location for the Engineer vein offset is in a previously unexplored area.

GMV Minerals Inc. conducted a drill program on the **RHG** property, 110 km southwest of Dease Lake. Two core holes were drilled in the RHG zone (Figure 1.48), one of four showings on the property (MINFILE 104G 178). Property geology comprises a sequence of Stuhini Group volcanic and sedimentary rocks intruded by diorite. Gold-copper-silver skarn-style mineralization up to 20 m thick is developed where diorite intrudes limestone.

'GOLDEN TRIANGLE' (THE STEWART DISTRICT)

At **Newmont Lake**, 30 km southeast of Galore Creek mine, Romios Gold Resources Inc. conducted an exploration program focused in the vicinity of the Northwest zone (MINFILE 104B 281). A length of 3603 m was drilled in 11 holes to upgrade an inferred resource of 1 406 000 tonnes grading 4.43 g/t Au, 0.22% Cu and 6.4 g/t Ag. A 40-kilometre induced polarization survey followed airborne electromagnetic and magnetic surveys. A total of 984 soil samples were taken. Gold-copper veins and skarn zones on the property are related to the northeasterly McClymont and Newmont fault zones that

Figure 1.44. Golden Eagle, drilling in the Tannis zone in 2006; rhyolite in nearby outcrops.

Figure 1.45. Yellow Jacket, Rino Mihoc, milling consultant, and Linda Dandy, project manager, at the pilot mill.

cut Paleozoic Stikine Assemblage, including limestone, and intrusive rocks. Two samples of the porphyritic intrusions submitted for geochronological analysis returned late Triassic uranium-lead ages of 203.1 and 214.1 Ma (Romios website). Assays of drill core returned up to 1.23 m grading 51.7 g/t Au, 33.7 g/t Ag and 0.97% Cu.

Figure 1.46. McKee Creek, banded and vuggy quartz-calcite veins in deformed argillite of the Cache Creek Group.

The **Dilworth** property, located 25 km north of Stewart, is a consolidation of gold and silver showings including, from north to south; Chicago, Hammer, Yellowstone (MINFILE 104B 039), Forty-Nine (MINFILE 104B 038), Helen and Oxidental (MINFILE 104B 142). Three new showings named Below the Road, Below Helen and Snow (Figure 1.49) were discovered. Ascot Resources Ltd. conducted silt, soil and rock chip sampling of trenches and an airborne electromagnetic, magnetic and gamma-ray survey that covered 500 line kilometres. A large drill program, 10 886 m in 63 drillholes, was completed to determine the extent of mineralized zones. Sulphide mineralization occurs with calcite and quartz in veins and breccia zones which are hosted by volcanic rocks of the Hazelton Group. Assays from mineralized drill core at the Snow zone, containing native silver, returned 3.23 m of 2.18 g/t Au and 2516.1 g/t Ag (Figure 1.50).

Figure 1.47. Engineer, Gayle Febbo (EMPR) and Fionnuala Devine (for BC Gold) examine drill core from 'A' shear zone.

Figure 1.49. Dilworth, geologists examine the newly discovered Snow gold-silver showing.

Figure 1.48. RHG, drill set up at top of cliff outcrop where chalcopyrite-bearing skarn is exposed.

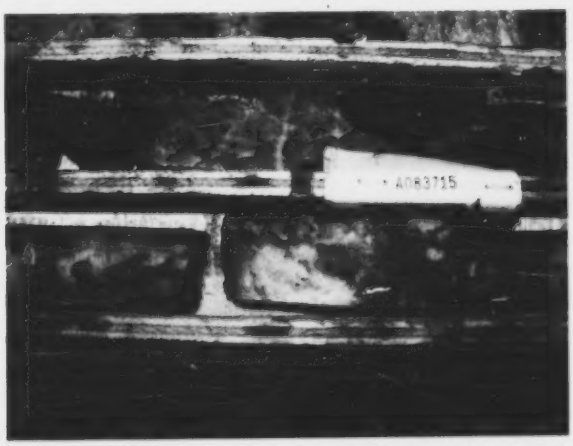

Figure 1.50. Dilworth, native silver and pyrite in quartz vein breccia from the Snow zone.

Pinnacle Mines Ltd. continued to drill on the **Silver Coin** property (also known as Silver Butte, MINFILE 104B 150) located 24 km north of Stewart. A large program of 88 drillholes, 12 216 m in total length, comprised dominantly infill drilling based on 20 m sections. Ten drillholes tested an eastern extension of the zone. Gold, zinc and silver bearing epithermal veins and breccias occur in Hazelton Group andesitic volcanic rocks (Figure 1.51). Prior to the 2007 program, inferred resources stood at 25.66 million tonnes grading 1.66 g/t *Au, 7.49 g/t Ag and 0.28% Zn at a cut-off grade of 0.75* g/t Au.

Geofine Consultants conducted exploration on the **Poly** project (MINFILE 104A 177) for Intuitive Exploration Inc. The property is located north of Highway 37A, 4 km west of Meziadin Lake. Geophysical surveys included 3 km of induced polarization and 4 km of magnetics. Four drillholes were completed, however only two reached bedrock. Mineralization is contained in quartz-sulphide veins that cut Hazelton Group volcanic rocks near a quartz monzonite stock of early Tertiary age.

The **Clone** property (MINFILE103P 251) is located 16 km west of Stewart and is jointly-owned by Teuton Resources Corp and Silver Grail Resources Ltd. Shear-controlled quartz veins cut Hazelton Group volcanic rocks and contain disseminated native gold and sulphide minerals. A length of 900 m was drilled in 10 holes, results include an intercept of 0.61 m grading 36.2 g/t Au.

Bravo Venture Group Inc. returned to the **Homestake Ridge** gold-silver prospect (MINFILE 103P 216) 35 km southeast of Stewart to complete 8602 m of drilling in 42 holes (Figure 1.52). The focus of the program was to test extensions of gold and silver mineralization, interpreted as stratibound, and explore for underlying mineralized structures. Mineralization occurs in Hazelton Group andesite and is thought to be related to major structures coeval with volcanism (pers. comm. Bruno Kasper, 2008). Epithermal textures are evident in drill core (Figure 1.53). Significant assay results include a 73 m intercept, approximately 52 m true width, grading 20.99 g/t Au. Infill and step-out drilling from 2007 and 2008 will significantly upgrade the inferred resource at Homestake Ridge. Based on drilling prior to 2007 the inferred resource was calculated at 2.3 million tonnes grading 7.53 g/t Au, 31 g/t Ag and 0.27% Cu, at a 3 g/t Au cut-off.

Bravo Venture Group Inc. also conducted an exploration program on the nearby **Fossie** property located 20 km northeast of Alice Arm (also known as Silver Basin, MINFILE 103P 181). Two drillholes (180 m) targeted quartz-sulphide veins and breccia in Stuhini Group strata.

SKEENA DISTRICT

The **TJ Ridge** property (MINFILE 094D 031) of Roxgold Inc comprises a series of veins mineralized with

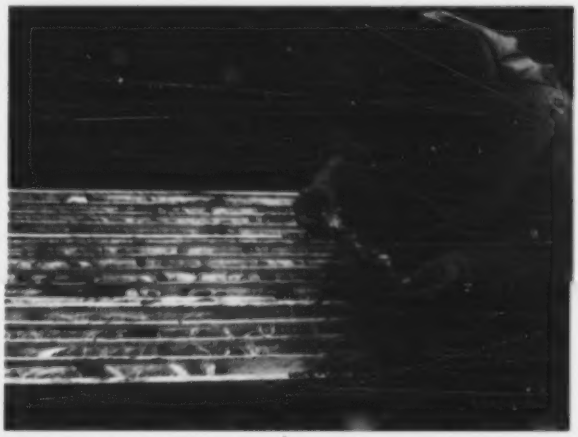

Figure 1.51. Silver Coin, Alex Walus, project manager, examines new core from a gold-bearing vein stockwork and breccia zone.

Figure 1.52. Homestake Ridge, helicopter-supported drilling near the toe of the Homestake glacier.

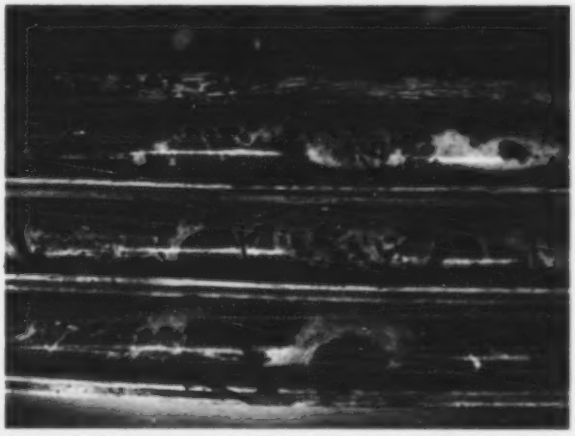

Figure 1.53. Homestake Ridge, quartz, calcite and light brown sphalerite heal a breccia in the gold zone.

base and precious metals, related to feldspar porphyry and monzonite dikes. These belong to the Bulkley suite and intrude Bowser Lake Group sandstone and shale. A 12 km access trail was built to bring equipment to the property, located 95 km north of Hazelton. Work comprised some three km of trenching, 20 km of 3D induced polarization, and 27 core holes totaling 4880 m. Veins with pyrite, pyrrhotite, arsenopyrite, sphalerite, galena and chalcopyrite also contain significant gold.

Strategic Metals Ltd drill tested the **Silver Ghost** silver-lead vein (MINFILE 103I 022), located about 60 km north of Terrace. A total of 140 m of core was drilled in two holes from one site.

Mountain Capital Inc explored the Burn gold showing (MINFILE 103I 211) on the **Kalum** property, located approximately 40 km north of Terrace. Eleven holes (1390 m) were completed. Gold occurs near the contact of the Allard granitic pluton. Hole KKM 08-01 intersected a quartz-shear vein that contained 28.7 g/t Au over 0.3 m. A 4.1 km induced polarization survey was completed to guide the drilling.

The **Terrace** property covers a large area approximately 30 km northeast of Terrace. Apex Geoscience Ltd conducted work for Argonaut Resources Inc completing two drillholes at M&K (MINFILE 103I 062), two at the Pass showing (2.5 km southeast of M&K) and six at Golconda (MINFILE 103I 076). The target is gold-silver-lead-zinc quartz veins at the contact between Hazelton Group volcanic rocks and granodiorite of the Coast Plutonic Complex. Drilling was guided by a 12.2 line kilometre induced polarization survey.

Grande Portage Resources Ltd completed the first drill test on the **Pass** property, located 42 km southwest of Smithers (MINFILE 093L 196). A quartz vein occurs in a quartz monzonite that intrudes Telkwa Formation tuffs and volcanic flows of the Hazelton Group. The vein averages 1-2 m in width but is up to 9.9 m wide in drill core and locally contains pyrite, chalcopyrite, sphalerite and galena. Total strike length of the mineralized structure is about 2 km with a strike of 030-040 degrees and a dip of 20-30 degrees to the southwest. A series of 24 holes were drilled over the length of the vein (Figure 1.54). Significant mineralized intervals include drillhole PAS-08-23 which intersected 2.46 m grading 12.84 g/t Au and 29.21 g/t Ag.

Located near French Peak some 65 km northeast of Smithers, Grizzly Diamonds Ltd. explored the Ute and Rio silver-gold-copper-lead-zinc veins on the **Peak** claims with a 1092.7 m diamond drilling program (MINFILE 093M 015). Five holes tested chargeability anomalies; the high signature has been attributed to widespread pyrite disseminations in Kasalka Group volcanic rocks. No drill results were available. A 5.8 line kilometre induced polarization survey was completed.

Five kilometres east of Moricetown, Megasilver Inc explored a small past-producing mine, **Virginia Silver** (MINFILE 093M 021). Sandstone of the Skeena Group contains silver-bearing veins and shear zones. A historic reserve of 20 000 tonnes grading 2948 g/t Ag, 1.19 g/t Au, 4.4% Pb and 2.2 % Zn was delineated by work in two adits. Work in 2008 comprised an induced polarization survey of 8.8 line kilometres followed by 6 diamond-drill holes with total length 1037 m.

Figure 1.54. Pass property, K.C. Smith, Wes Raven (project manager) and Nichole Prichard visit the drill during a brief drilling shut-down.

The **Dome Mountain** project (also known as Free Gold, MINFILE 093L 023) is located 35 km east of Smithers and includes the Dome Mountain gold mine that operated in 1992-93. Dome Mountain is an orogenic quartz vein deposit within andesite of the Nilkitkwa Formation, part of the Hazelton Group. The company reopened two portals, three air vents and the mine access road, and completed a 22 km induced polarization survey. Eagle Peak Resources intends to validate an historic resource and then to re-open the mine for production.

The target on the **Topley Richfield** property (MINFILE 093L 018) is gold and silver veins. NXA Inc explored the property, located approximately 60 km east-southeast of Smithers, to confirm and expand a historic resource of 181 420 tonnes grading 4.25 g/t Au and 191.96 g/t Ag. The area is underlain by pyroclastic rocks of the Telkwa Formation, Hazelton Group. Induced polarization, magnetic and soil geochemical surveys were used to guide drilling in the extensively drift-covered property (Figure 1.55). Drilling totaled 2706 m in 14 holes.

GMV Minerals Inc explored for epithermal gold and silver mineralization on its 50 km long **Nechako** property 70 km south of Burns Lake. Faults are associated with crustal extension and related felsic and mafic volcanism in the Nechako Basin. Geophysical surveys comprised 40.7 km of induced polarization surveys on two grids and 76.2 km of magnetic surveying on three grids. Six holes were drilled totaling 2164 m (Figure 1.56).

Figure 1.55. Topley Richfield, Erin O'Brien (project manager) and Janice Girling (EMPR) beside two drillhole markers in overburden covered terrain.

Figure 1.56. Nechako, inspecting drill core.

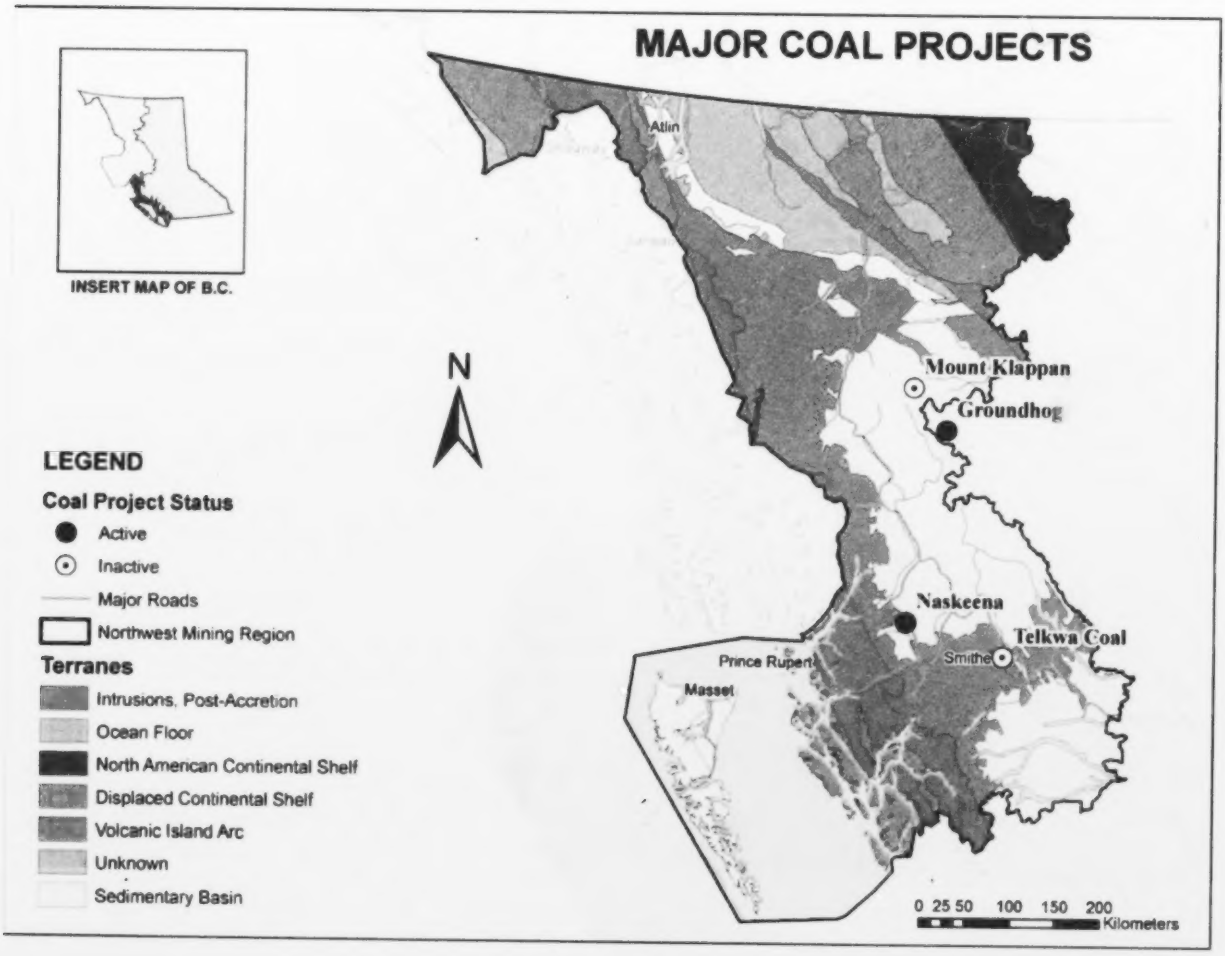

Figure 1.57. Major Coal Projects, Northwest Region.

The **Coles Creek** project of Callinan Mines Ltd evolved from a porphyry copper target (MINFILE 093E 042) to a new silver-base metal prospect. Located 90 km south-southwest of Houston, the property is underlain by Kasalka Group volcanic and sedimentary rocks. Silver, lead and zinc mineralization is associated with intense stockwork and breccia zones. Eleven holes (3267 m) were drilled as step-outs from weak silver mineralization discovered in 2007; three drillholes targeted nearby structures. A 100 km grid was cut for induced polarization and magnetic surveys, soil sampling and prospecting were also conducted on the grid. Hole 18 intersected 141 m grading 20.5 g/t Ag, 0.32% Zn and 0.17% Pb.

COAL AND AGGREGATE PROJECTS

Coal in Northwest region occurs in the Jurassic-Cretaceous marine basin filled by sedimentary rocks of the Bowser Lake Group (Figure 1.57). Extensive deposits of anthracite are found in the Klappan-Groundhog coalfield; the Mount Klappan project is described in a preceding section of this report. The Bowser basin measures 300 by 150 km, though it is structurally compressed from its original extent. Further north in the Atlin-Taku district, the northwest axial Whitehorse Trough is a sedimentary basin of similar Jura-Cretaceous age but it is not known to contain significant coal in British Columbia. Coal-bearing deltaic sequences of the Lower Cretaceous Skeena Group are preserved in fault grabens on the southern margin of the Bowser basin. Notable examples are in the Bulkley valley and Terrace-Kitimat graben; these are close to rail and other infrastructure. Smaller basins of Early Tertiary age also contain coal in Northwest region; at Tuya River west of Dease Lake and at Coal River east of Watson Lake.

West Hawk Development Corp drilled 11 large-diameter holes in the **Groundhog** coalfield (MINFILE 104A 078) located 180 km north of Hazelton. Large diameter core (PQ size) was extracted for analysis of coal quality characteristics. Westhawk opened a field office in Hazelton and negotiated access to the property over a two year period; the 2008 program was the first step to evaluate its development potential.

Jet Gold Corporation drilled nine holes (1400 m) on its **Naskeena** coal property (MINFILE 103I 002) located 50 km north of Terrace. Coal underlies the 5 km wide Kitsumkalum River valley near the north end of the Terrace-Kitimat graben. Age of the coal measures is uncertain as the separation of Bowser Lake Group (Jurassic) and Skeena Group (Cretaceous) is not distinct. Preliminary coal quality data indicate high fixed carbon content of up to 62%, low volatile material in the order of 5% and low sulphur, about 0.4% (D. McRae, pers. comm., 2008). These are characteristics of high ranking anthracite coal.

OUTLOOK FOR 2009

The 2008 downturn in the mining industry will lead to opportunities in 2009 for those with access to capital to acquire projects of exceptional merit. Risk capital will be in short supply and companies that cannot access exploration funding may not survive. Base metal projects will be more difficult to advance and may be 'on hold' until metal prices recover. The continuing strong price for gold means that gold projects, particularly those with low-risk resources and favourable location, will continue in 2009. The commitment was made by the province to spend $10 million on the environmental assessment process and First Nations consultation for the **Northwest Transmission Line** along Highway 37 in northwestern British Columbia. The new 287-kilovolt line would extend 335 km from Terrace to Meziadin Junction and north to Bob Quinn Lake. The Province plans to partner with the private sector to fund the total project, which is estimated to cost approximately $400 million. A continued and growing spirit of working together between industry and all levels of government – First Nation, Municipal, Provincial, Federal and United States – will lead to growth in the northwest British Columbia mining industry.

ACKNOWLEDGMENTS

The authors are very thankful for the contributions made by the mine staff, exploration geologists and prospectors who work in northwest B.C. This report would not be possible without their input. Their hospitality while visiting projects is greatly appreciated. Valuable assistance was also provided by other staff in the Smithers office of the Ministry of Energy, Mines and Petroleum Resources. Patience and skillful work by Garry Payie to prepare this paper is greatly appreciated. Errors or omissions remain the responsibility of the authors.

NORTHEAST REGION

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SUMMARY AND TRENDS

The year 2008 saw a significant resurgence of exploration activity and mine development in the Northeast Region.

Peace River Coal Inc (PRC), the operating entity for the Peace River Coal Limited Partnership (73.8% Anglo Coal Canada Ltd, 14.2% Hillsborough Resources Ltd, 12.0% Northern Energy and Mining Inc) continued mining its **Trend** property south of Tumbler Ridge, with the intent of adding to production from the nearby **Roman Mountain** deposit beginning early in 2012. PRC continued exploration on its **Horizon** project to the north of Roman Mountain.

Western Canadian Coal Corp (WCC) continued operation of the **Perry Creek** mine within the **Wolverine Project** west of Tumbler Ridge, and of the **Brule** mine south of Chetwynd. WCC purchased the **Willow Creek** property and infrastructure west of Chetwynd in June 2007, and in September 2008 began mining operations there with a view to beginning coal sales in mid-2009. In late November, however, mining operations were suspended temporarily at Willow Creek due to market uncertainties.

Other projects, which the proponents intend to advance for mine development are **EB** and **Hermann** (WCC), **Wapiti** (Hillsborough Resources Ltd), **Goodrich Central South** (First Coal Corp), and **Gething** (Canadian Dehua International Mines Group Inc). In late November 2008, the Hermann project was granted an Environmental Assessment (EA) certificate.

First Coal was particularly active in exploring its **Goodrich Central South** project east of Chetwynd, working towards taking a 100 000 tonne bulk sample in 2009. The Belcourt-Saxon Coal Limited Partnership, a 50/50 joint venture of Peace River Coal with Western Canadian Coal, undertook a drilling project on the **Belcourt West** project southeast of Tumbler Ridge. A new player in the area, Colonial Coal Corp, carried out exploration drilling on its **Huguenot** project nearby.

Estimated exploration expenditures for 2008 stood at $22 million, double the $10.5 million in 2007. Similarly, 2008 drilling activity, at about 54 600 m, was up considerably from 37 400 m in 2007 (Figures 2.1, 2.2). Locations of mines, developments and exploration projects are shown in Figure 2.3.

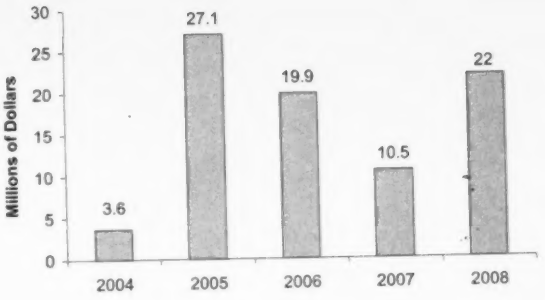

Figure 2.1. Annual Exploration Expenditures, Northeast Region. (Note: Prior to 2004, expenditures were included with the North-Central Region).

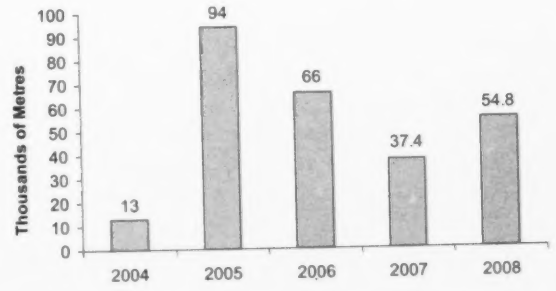

Figure 2.2. Annual Exploration Drilling, Northeast Region (Note: Prior to 2004, drilling statistics were included with the North-Central Region).

COAL MINES

Three coal mines were operating in the Northeast Region in 2008, namely PRC's **Trend** mine, and WCC's **Perry Creek (Wolverine Project)** and **Brule** mines. A fourth project, WCC's **Willow Creek**, began mining operations in September but was not expected to ship coal before mid-2009. In late November, the project was suspended pending more certainty of suitable prices in coal markets. Mining activity is summarized in Table 2.1.

Figure 2.3. Operating Mines, development projects, and major exploration projects, Northeast Region, 2008.

TABLE 2.1. FORECAST MINE PRODUCTION, NORTHEAST REGION, 2008

Mine	Operator	Deposit Type/ Commodity	Work Force	Forecast Production (2008), tonnes	Measured and Indicated Resources (effective date)
Trend	Peace River Coal Inc	Metallurgical Coal	~80	1 400 000 t	21.6 million tonnes ROM (June 2007)
Wolverine (Perry Creek)	Western Canadian Coal Corp	Metallurgical Coal	~400 including contractors	2 200 000 t	32.5 million tonnes ROM (February 2008)
Brule	Western Canadian Coal Corp	PCI Coal	~60	1 300 000 t	38.6 million tonnes ROM (December 2007)

Peace River Coal's **Trend** mine, commissioned in January 2006, is located about 25 km south of Tumbler Ridge. Medium-volatile bituminous coal is being mined from the Lower Cretaceous Gates (D, E, F, G/I and J seams) and Gething formations with a cumulative coal thickness of 15 metres, in a narrow pit that exploits a tight upright fold (Figure 2.4). Production in 2008 was targeted at 1.4 million tonnes of mostly metallurgical coal with a small amount of thermal coal. Production is expected to increase to a total of 3 million tonnes/year by 2012 as the nearby **Roman Mountain** deposit is added to production.

A pre-feasibility study on the **Roman Mountain** project was expected to be completed by the New Year 2009, to be followed closely by EA and Mine Permit applications. Like Trend, Roman Mountain would exploit both the Gates and Gething formations. The main pit would release coal from the Gates Formation within an upright syncline; and Gething Formation coal would be mined from two small pits, one on each side of the main pit. To the north of Roman Mountain, PRC proposes to develop the **Horizon** block as a combined open pit/underground operation.

The estimated production life of the **Trend** mine is about ten years, based on ROM reserves of 21.6 million tonnes. This will be supplemented by production from **Roman Mountain**, with a proposed 15-year life expectancy at an annual production of 2 to 4 million clean tonnes. The **Horizon** mine, once brought into production, could have a life expectancy of about 17 years with an annual production of up to 2 million tonnes.

PRC had changed from contractor mining to owner-operated mining by the end of 2008 and, in that regard, purchased essential mining equipment including heavy trucks and blast hole drills (Figure 2.5). The work force is expected to increase gradually from 80 to about 300. PRC's loadout facility, a few kilometres north of the Trend mine, was completed in 2007. From here the company ships, through the Ridley Terminals Inc at Prince Rupert, to markets in Japan, Korea and Europe.

Western Canadian Coal's **Wolverine** Project, about 25 km to the northwest of Tumbler Ridge, saw continued production from the **Perry Creek** mine, which began operations in July 2006 (Figure 2.6). Current production of about 2.2 million tonnes/year of clean metallurgical coal is from the Gates Formation (E, F, G and J seams) with a cumulative coal thickness of 15 m. Mining operations within "Phase 1" of its mining plan were completed in March 2008, and the company has moved on primarily to Phase 3. Subject to regulatory approvals, output is projected to increase to 3 million tonnes/year, which would equal the capacity of the preparation plant. The projected pit life is ten years. Shipping is through Ridley Terminals Inc to markets in Asia, Europe and South America. Current total reserves stand at 32.5 million tonnes measured and indicated for Perry Creek, to which could be added a total of 42.4 million tonnes if the nearby **EB** and **Hermann** deposits are included.

WCC's **Brule** mine is located about 45 km south-southwest of Chetwynd adjacent to the former Dillon mine, which closed in September 2006 after reserves were exhausted. As in the case of the other producing mines in the region, the rock units are deformed into tight upright folds, making for long and narrow trough-shaped pits. Brule began shipping "ultra-low volatile" PCI (bituminous) coal in March 2007, releasing coal from seams designated Upper, Lower and Seam 60, in the Gething Formation with a cumulative thickness of 12.2 m (Figure 2.7). Forecast production in 2008 was 1.3 million tonnes run-of-mine coal, and the company's intent is to increase this to 2.0 million tonnes/year in 2009. *In situ* reserves as of December 2007 stood at 38.6 million tonnes, of which 36.3 million tonnes were assigned to the Brule deposit, with the balance to the **Blind** deposit. The Brule Mine employs about 60 WCC workers on-site, and the operation is in the transition process from contractor

Figure 2.4. Releasing coal at the Trend Mine.

mining to owner-operated mining. At present, coal is trucked to the Bullmoose loadout facility. Plans had been to build a road northward to the **Willow Creek** mine (the Falling Creek haul route) to make use of that facility's wash plant and shipping infrastructure (Figure 2.8), but those plans were put on hold with the suspension of operations at Willow Creek.

WCC's two mines offer the combined potential of 6 million tonnes/year of coal production for at least 15 years. An Environmental Assessment (EA) certificate is in place for the **EB** deposit, with about 8 million tonnes of coal resource, located near the Perry Creek operation. A fourth deposit, the **Hermann** project, is located 16 km southwest of Tumbler Ridge, and would add an additional 10.7 million tonnes of coal resource. An EA certificate for the Hermann coal mine project was granted in late November 2008.

COAL EXPLORATION PROJECTS

Significant exploration projects in the Northeast Region are listed in Table 2.2. This compilation was assembled prior to the end of the calendar year and contains some estimates of the work completed.

Figure 2.9 offers an estimated breakdown of 2008 expenditures by category (early stage exploration, advanced-stage exploration/deposit appraisal, mine evaluation, and mine property exploration). For this discussion, early-stage exploration is considered as focussed activity based on a deposit model. It may include geophysics, geochemistry, trenching and drilling. Advanced-stage exploration is concerned with resource definition emphasizing drilling, but included may be baseline environmental studies, economic pre-feasibility work, and exploration of secondary targets. Mine evaluation begins with the firm commitment to develop a resource; and concentrates on the environmental, social, engineering and financial assessments of a project. Mine property exploration is on-lease in respect of a producing mine, and is work other than that done within or immediately adjacent to the deposit.

Figure 2.5. New "Pit Viper" blast hole drills at the Trend Mine.

Figure 2.6. Hauling waste at the Perry Creek Mine.

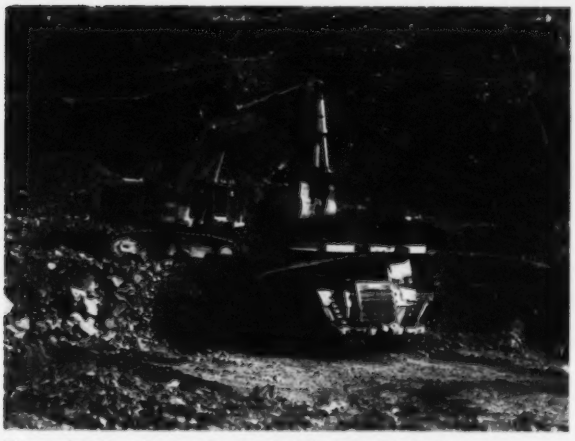

Figure 2.7. Loading at the South Blind Pit, Brule Mine.

Figure 2.8. Grizzly, crusher and wash building at the Willow Creek mine site.

SOUTH OF TUMBLER RIDGE

During 2008, Peace River Coal Inc continued evaluation of its **Roman Mountain** project, located adjacent to the Trend mine, completing an additional 14 600 m of drilling. About 27 million in-place tonnes of coal had been identified in the Roman Mountain deposit as of June 2007. The coal measures at Roman Mountain occur in a tight upright syncline at the top of the mountain and extend for up to 7 km along strike (Figure 2.10). The environmental assessment process for the project began in November 2007, and the intent is that it be completed in 2008 with production in 2009 subject, to approvals being in place. A pre-feasibility study on the project was undertaken in 2008 as well. In 2008, the Partnership also completed some 900 m of on-lease drilling at the adjacent **Trend** mine to extend reserves.

An additional 8010 m of drilling were completed at PRC's **Horizon** project (Figure 2.11), with an Environmental Assessment application expected to be submitted late in 2008. About 42 million tonnes of metallurgical and PCI coal resource have been identified. Production could begin in 2010 at 1.2 million tonnes/year from the gently-folded coal measures in the Gates and Gething formations.

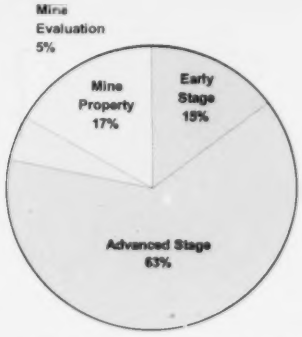

Figure 2.9. 2008 Exploration expenditures by category, Northeast Region.

TABLE 2.2. SIGNIFICANT EXPLORATION PROJECTS, NORTHEAST REGION, 2008

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program
Belcourt West	Belcourt-Saxon Coal Limited Partnership	093I 014, 16	Metallurgical Coal	Sedimentary	A, PD (2100 m) DD (1800 m)
Brule (Blind Pit)	Western Canadian Coal Corp	093P 007	ULV PCI Coal	Sedimentary	PD (1050 m)
Goodrich Central South	First Coal Corp	093O 034	Metallurgical Coal	Sedimentary	A,TR,GD (1520), DD (11 180 m)
Horizon (Five Cabin)	Peace River Coal Inc	(093I 086)	Metallurgical Coal/PCI Coal	Sedimentary	A, PD (7010 m), DD (1000 m)
Huguenot	Colonial Coal Corp	(093I 049, 50)	Coal	Sedimentary	A, TR, PD (1623 m), DD (13 m)
EB (Wolverine)	Western Canadian Coal Corp	093P 015	Coal	Sedimentary	A, PD (1115 m)
Perry Creek (Wolverine)	Western Canadian Coal Corp	093P 025	Metallurgical Coal	Sedimentary	A, PD (2500 m) DD (426)
Roman Mountain	Peace River Coal Inc	093I 030	Metallurgical Coal	Sedimentary	A, EN, PF, PD (12 600 m) DD (2000 m)
Trend Mine Extension	Peace River Coal Inc	093I 030	Metallurgical Coal	Sedimentary	PD (400 m), DD (500 m)
Willow Creek	Western Canadian Coal Corp	093O 008	Metallurgical Coal/PCI Coal	Sedimentary	PD (7330 m) DD (475 m)

Exploration Category: E = Early-Stage, A = Advanced-Stage, ME = Mine Evaluation, MP = Mine Property

Work Program Abbreviations:

A = access (trail, road construction on claims); AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm)= diamond drilling totalling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping etc.; GC = geochemical sampling (rock, soil, silt etc.); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing (primarily for industrial mineral products); MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; R = reclamation; RC = reverse circulation drilling; TR = trenching; UG (Xm) = X metres of underground development; UG-BU= underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

Figure 2.10. Drilling on Roman Mountain (courtesy Peace River Coal).

The Belcourt-Saxon Coal Limited Partnership, a 50/50 joint venture of Peace River Coal with Western Canadian Coal, undertook a 3900 m drilling project on the **Belcourt West** project, located about 90 km southeast of Tumbler Ridge. The partnership is exploring a set of Gates Formation coal seams, and WCC is of the view that the Belcourt-Saxon project area has the potential to produce up to 5 million tonnes/year.

Colonial Coal Corp completed trenching and a 1650 m drilling program on its **Huguenot** project near the Belcourt West project. The company was following the southeast extension of the Belcourt South coal deposit, and successfully defined coal seams in both the Gates and Gething formations in the northwestern portion of the property. The plan for 2009 is to extend the investigation to the remainder of the property, south of Holtslander Creek.

Figure 2.11. Percussion drill at the Horizon Project.

WOLVERINE VALLEY AREA

Western Canadian Coal continued its on-lease drilling program around the **Perry Creek** mine in its Wolverine Project area, planning to define and extend reserves to about ten years at the projected production rate. Fourteen rotary and three diamond drill boreholes were completed, totalling about 2900 m. The Perry Creek pit is planned to be enlarged, and pit life extended to about 10 years at the projected production rate.

Included in the Wolverine Project is the nearby **EB** deposit. Whereas the Gates Formation beds at the Perry Creek operation are characterized by tight upright folds, at EB the unit is nearly flat-lying. About 7.4 million tonnes of ROM metallurgical coal are available at EB, and were delineated further by some 1100 m of drilling in 2008.

WCC's **Hermann** project is located south of the Perry Creek mine and about 16 km southwest of Tumbler ridge. Exploration drilling on the property is complete, and in late November the Province granted the Company an EA certificate for the proposed mine. That process had been suspended as WCC focused on permitting the EB deposit, but was re-started in August 2008. Mining is proposed from four pits to access five seams (E, E4, F, G and J) the Gates Formation, having an aggregate thickness of 14.8 m. From a coal resource of about 9.0 million tonnes, production would be at the rate of 0.8 to 1.1 million tonnes/year.

CHETWYND - PINE RIVER AREA

Western Canadian Coal's **Willow Creek** mine area is more complex structurally than those to the south, and is characterized by tight anticlines and synclines overturned to the west. Pulverized Coal Injection (PCI) and metallurgical coal had been extracted previously from two pits in the "Central Zone," from the Gething Formation in which Seams 1 though 8 are accessible in tight upright folds. Initial production from the re-opened mine would be from this zone at about 900 000 tonnes/year, increasing over the following two years to as much as 2.2 million tonnes, subject to approvals, as the "North Zone" is developed (Figure 2.12). In 2008, WCC continued an on-lease drilling program to define better the coal resource, completing sixty-six boreholes totalling about 7800 m. Total *in situ* measured and indicated resources, as of November 2007, stood at 33.0 million tonnes. Mine life could be as long as 15 years depending, of course, upon the rate of production.

Western Canadian also conducted an on-lease exploration program at its **Brule** mine, completing some 1050 m of percussion drilling to extend reserves.

First Coal Corp pursued an extensive drilling program on its **Goodrich Central South** property southwest of the former Willow Creek mine. About 41 million tonnes of measured and indicated and 32 million tonnes of inferred metallurgical coal resource have been identified, principally in the Bickford Formation but with some in the overlying Gething Formation. In 2009, First Coal plans to extract a 100 000 tonne bulk sample by remote means using an adaptation of a conventional AddCar unit to the steeply-dipping seams at the proposed

Figure 2.12. Site Preparation at Willow Creek North Zone.

mine site. Contingent upon a successful outcome, the property may advance to EA and major mine permitting in 2009. In 2008, some 11 200 m of diamond drilling and 1500 m of geotechnical/hydrogeological drilling were completed (Figure 2.13).

Figure 2.13. First Coal's VP Operations David McSkimmings with a new drill.

HUDSON'S HOPE AREA

Canadian Dehua International Mines Group Inc intends to develop its **Gething** property, located about 25 km west of Hudson's Hope, as an underground operation. Production would be from the upper 150 m of the Lower Cretaceous Gething Formation, in which previous exploration had identified 8 significant coal seams with an inferred resource of 98 million tonnes of coal. By late 2007, the project was in the EA pre-application stage. No additional exploration was undertaken during 2008.

OUTLOOK FOR 2009

Coal prices remained high in 2008, and that tended to insulate the coal sector in otherwise uncertain economic times. Continued growth in 2009 will be contingent upon market support for the resource sector generally, and of course with respect to coal in particular. Companies, government and First Nations are working towards building relationships and agreements that provide a more certain context for exploration and mining activity.

ACKNOWLEDGMENTS

The writer acknowledges with thanks the support of staff in the Prince George Regional Office, and in particular Mines Inspectors Victor Koyanagi and Marnie Marchuk for critically reading an early draft of this report. In the Geological Survey Branch, Tania Demchuk provided valuable suggestions and feedback.

NORTH-CENTRAL REGION

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SUMMARY AND TRENDS

Production continued from three open pit metal mines in the Region – Gibraltar, Mount Polley and Kemess – with all three experiencing productive and profitable years. Cross Lake Minerals' QR mine began underground production from its gold skarn deposit near Likely, phasing out its previous open pit operation. Sable Resources' Shasta underground silver-gold operation in the Toodoggone area continued seasonal production.

The Central Region saw a reduction in exploration after an extraordinary 2007, but activity remained well above that of recent years generally. Following eight years of steady increases in exploration expenditures, the total amount in 2008 was $80 million, down from $94.1 million in 2007 but still well above the 2006 amount of $46.3 million. Likewise, drilling activity, at a total of 259 000 m, was down from 2007 but still high compared to other recent years (Figures 3.1, 3.2).

The principal exploration focus remained upon porphyry copper-gold prospects in the Quesnel and eastern Stikine terranes, with significant new exploration activity in the area covered by Geoscience BC's QUEST (Quesnellia Exploration Strategy) 2007 project. QUEST involved a regional airborne EM and airborne gravity survey extending roughly from Williams Lake to west of MacKenzie with some areas of geochemical sampling and aimed at encouraging further exploration in this heavily drift-covered area. In addition to porphyry deposits, sediment-hosted gold (SHG), volcanogenic massive sulphide (VMS) and sedimentary exhalative (SEDEX) deposits remained important targets.

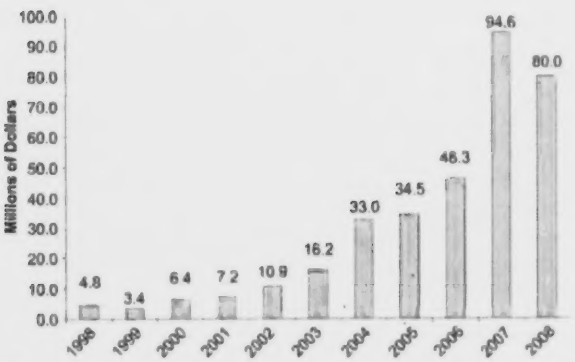


Figure 3.1. 2008 Annual Exploration Expenditures, North-Central Region.

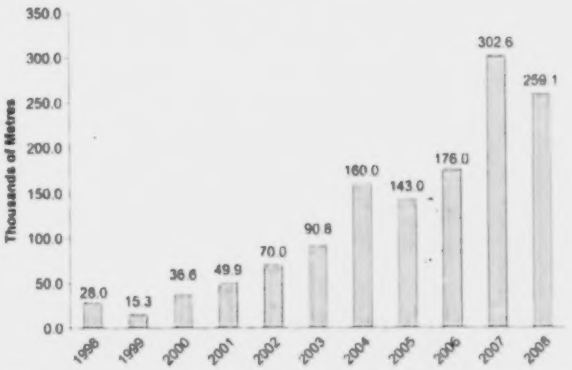


Figure 3.2. 2008 Annual Exploration Drilling, North-Central Region.

Exploration highlights, in alphabetical order of project, included:

- A 2700 m drilling program on Dajin Resources' **Addie 2** mesothermal vein gold prospect;
- An intensive diamond drilling program (over 6000 m) by Canada Zinc Metals Corp (Formerly Mantle Resources) on the **Akie** zinc-lead-silver sedex prospect in the Gataga-Kechika Trough area north of Williston Lake;
- Airborne magnetic, geochemical surveying and 1400 m of diamond drilling on Amarc Resources Ltd's **Rodine-Warren** VMS prospect;
- Continued drilling by International Wayside Gold Mines Ltd on its **Bonanza Ledge** and Cow Mountain projects near Wells to extend potential reserves;
- IP geophysics and a 2300 m drill program on Pacific Cascade Minerals' **Brewster Lake** porphyry molybdenum project;
- Renewed interest in the **Capoose-Silver Quest** prospect, with geochemical and IP exploration and a 1600 m drilling program by Silver Quest Resources Ltd;
- Ground IP and magnetic surveys, geochemistry and 1100 m of drilling by Orestone Mining Corp on its **Captain** porphyry copper-gold prospect;

- A 43 000 m drilling program at the TTM Resources Inc's **Chu** porphyry molybdenum prospect to define the extent of the mineralized zone;
- A drilling program of over 2400 m by Newcrest Mining Ltd at its **Croy-Bloom** prospect;
- Follow-up drilling of almost 3000 m by Geoinformatics Exploration Canada Ltd to help define its **Falcon** project porphyry molybdenum discovery made in 2007;
- Recognition that the **Frank Creek** prospect (Barker Minerals Ltd) is a Kuroko-style VMS deposit, leading to a 2400 m drilling project there;
- Intensive exploration, by over 10 000 m of drilling, of Hawthorne Gold Corp's **FraserGold** project;
- A very active drilling program of over 33 000 m on Taseko Mines' **Gibraltar** mining lease with the aim of further extending reserves;
- Over 2000 m of drilling by Newstrike Resources Ltd on its **Jean** porphyry copper-molybdenum porphyry prospect;
- Geochemical exploration, and continuation a drilling program of over 31 000 m by Serengeti Resources Inc to delineate alkalic porphyry copper-gold mineralization at its **Kwanika** project;
- Almost 6000 m of drilling by Teck on its **Lorraine-Jajay** porphyry copper-gold deposit;
- Continuation by Alpha Gold Corp of diamond drilling on its **Lustdust** property located near Serengeti's Kwanika project;
- An extensive program of geophysical and geochemical exploration, and about 1000 m of drilling, by GGL Diamond Corp on its **McConnell Creek** property;
- A significant drilling program of over 4300 m by Northern Rand Resource Corp on its **Megaton** copper-gold porphyry prospect;
- Completion of a major drilling program (42 holes and over 10 000 m) and preliminary environmental/metallurgical studies by Leeward Capital Corp on its **Nithi Mountain** porphyry molybdenum deposit;
- On and off-lease drilling totalling over 16 000 m by Imperial Metals Corp at its **Mount Polley** mine to extend reserves;
- Completion of a 2100 m drill program begun in 2007 by Starfire Minerals Ltd at its **Porphyry Pearl** project;
- A regional IP and geochemistry survey, with overburden drilling, of some 15 target areas on its **Prince George Porphyry** project area by Xstrata Copper Canada;
- Underground exploration by Cross Lake Minerals Ltd at its **QR** mine;
- IP and geochemical exploration, and an airborne magnetic survey, by a Serengeti Resources Inc/Fjordland Exploration Inc joint venture covering 27 properties in its "**QUEST**" program;
- Underground exploration by Sable Resources Ltd at its **Shasta** mining operation in the Toodoggone area;
- Over 40 000 m of systematic drilling, and geochemistry, by Skygold Ventures Ltd at **Spanish Mountain** to define its SHV gold deposit there;
- Further exploration, by IP and geochemical surveys and over 7000 m of drilling, by Fjordland Exploration Inc of the "Southeast zone" at the **Woodjam** copper-gold-molybdenum porphyry prospect, and discovery of the new "Deerhorn zone."

MINES AND QUARRIES

Estimated production and reserves of operating mines are provided in Table 3.1. Locations of mines and exploration projects discussed in this report and considered to be of regional significance are shown in Figure 3.3. Placer exploration and mining, while a significant traditional activity within this region, is not considered in this report.

METAL MINES

Imperial Metals Corporation's **Mount Polley** alkalic porphyry copper-gold mine, located west of the town of Likely and about 56 km northeast of Williams Lake, increased mill throughput over 2007 levels by about 5 per cent compared to the same period in 2007 (Figure 3.4). At that rate, 2008 production would amount to over 28 million kg Cu, 1311 kg Au and 15 350 kg Ag. Total proven and probable reserves as of January 1, 2008 were 55.6 million tonnes grading 0.36% Cu, 0.32 g/t Au and 0.66 g/t Ag – an increase of 4.3 million tonnes over the January 1, 2007 estimate. This increase extended mine life to May, 2015. About 16 200 m of on-lease diamond drilling were completed in 2008 (see "Exploration Highlights" below), primarily on the Boundary, Springer, Pond and Kidney zones. The Pond zone is the first in which skarn-type mineralization has been encountered. The Bell open pit was mined out in July 2008 and the Wight Pit was to have been mined out by the end of 2008.

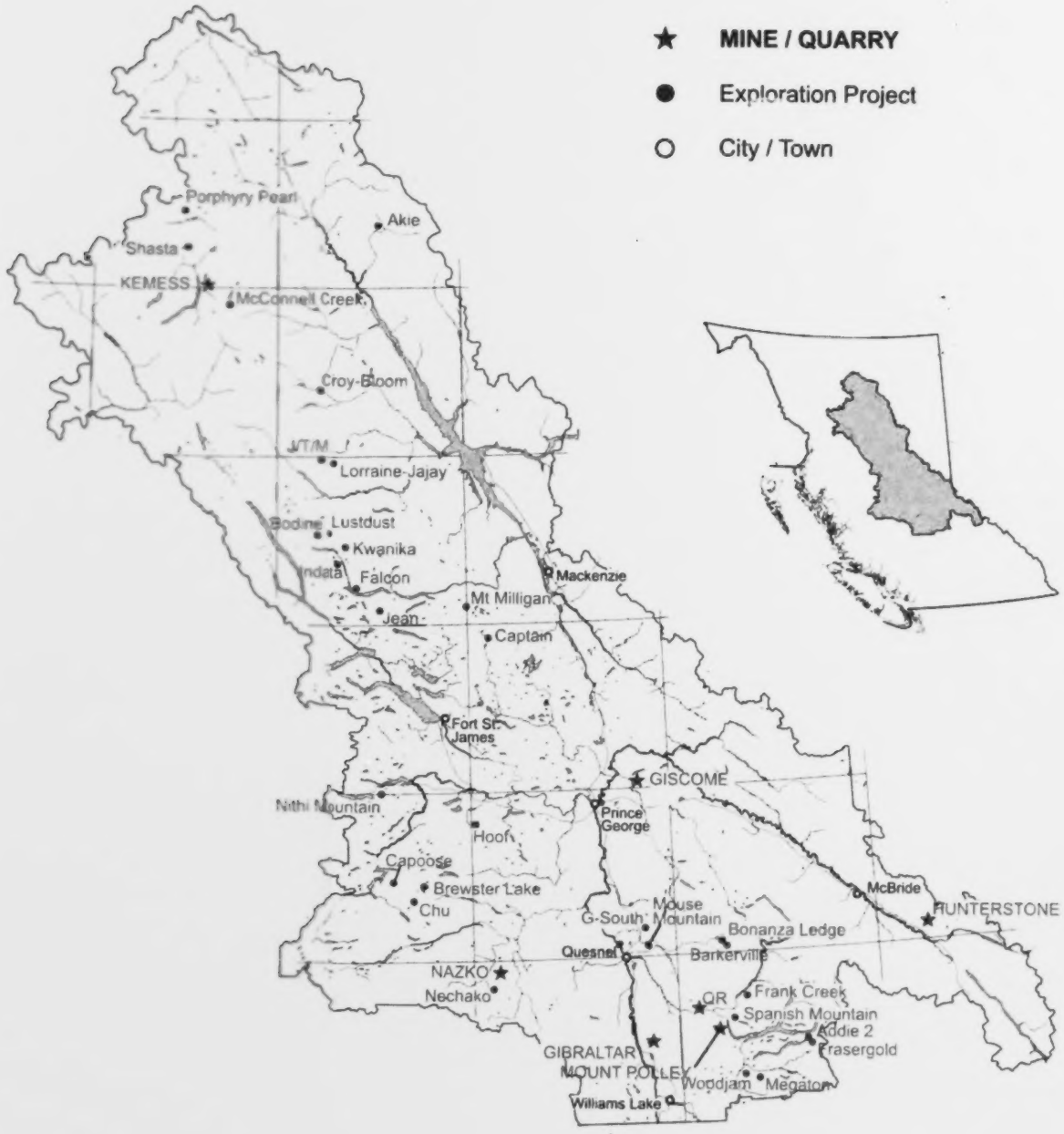


Figure 3.3. Operating mines, major exploration projects and selected smaller projects, North-Central Region, 2008.

TABLE 3.1. FORECAST MINE PRODUCTION, NORTH-CENTRAL REGION, 2008

Mine	Operator	Mine Workforce	Forecast Production (tonnes or kilograms)	Measured and Indicated Resources (effective date)
Metals				
Mount Polley	Imperial Metals Corp	397	38.1 million kg Cu 992 kg of Au 2 260 kg of Ag	104.9 million tonnes grading 0.33% Cu, 0.31 g/t Au, (March 2008)
Gibraltar	Taseko Mines Ltd	~325	26.8 million kg Cu 299 825 kg Mo (fy ending 30 Sept.)	428 million tonnes proven grading 0.32% Cu, 0.008% Mo (December 2008)
QR	Cross Lake Minerals Ltd	46, + 24 contract	539 kg Au	356 000 tonnes grading 5.7 g/t Au (September 2007)
Kemess South	Northgate Minerals Corp	~400	5925 kg Au 27 669 tonnes Cu	51.8 million tonnes (December 2007)
Industrial Minerals				
Giscome	Pacific Lime Products Ltd	2 (seasonal)		
Nazko	Lightweight Advanced Volcanic Aggregates Inc	5 (seasonal)		44 million tonnes "proven resource"
Hunterstone	Hunterstone Quarries	~3 (seasonal)	350 tonnes	
Giscome	Canadian National Railway Company	~5 (seasonal)		

Meanwhile, large scale production was beginning from the Springer Pit (Figure 3.5). Imperial's intent is to begin underground mining beneath the Wight Pit by 2010. In November 2008, in the context of declining metal prices and economic uncertainty, Imperial Metals issued February 2009 layoff notices to 49 of its mine employees.

A 200 000 tonne test heap was operated in 2008 to prove the feasibility of leaching metal from ore from the copper oxide cap that covers the Springer pit sulphide mineralization. Copper recoveries were anticipated to be in the range of 85 per cent, but actual recoveries have not measured up to expectations.

The **Gibraltar** mine, owned and operated by Taseko Mines Ltd, is located about 19 km east of McLeese Lake (Figure 3.6). Production is from a copper-molybdenum calc-alkalic porphyry, the so-called "mine series tonalite." In December 2008, Taseko announced a 28% reserve increase following an intensive on-lease exploration drilling program. That program, in Gibraltar East and an area northwest of Gibraltar West (the Gib West Extension), consisted of over 33 000 m of diamond drilling with the goal of adding to the mine's reserve base. With the announced additions, reserves stood at 428 million tonnes grading 0.315% Cu and 0.008% Mo, containing an additional 290 000 tonnes of Copper, with the mine life extended to 2035.

The Solvent Extraction and Electrowinning plant at Gibraltar was refurbished by the end of 2006, and in 2007 about 1.1 million kg of copper cathode was produced. The facility has the capability of producing over 3 million kg annually from oxidized copper ore stockpiled on the property.

A first phase of mill expansion was completed in April 2008, with an investment of $76 million. Phase II modifications, to be complete by the end of 2009, will bring the mill up to its designed capacity of 49 800 tonnes/day; and Phase III will increase that further to 77 100 tonnes/day in 2010. At that point Gibraltar's annual production is expected to be 82 million kg of copper and 1.6 million kg of molybdenum. Concentrate is shipped by rail through the port of North Vancouver. In November 2008, 75 mine workers were laid-off in the context of streamlining operations.

Figure 3.4. Filtration tank, Mount Polley Mine Mill.

Figure 3.5. Blasting in the Springer Pit, Mount Polley Mine.

Figure 3.6. Loading operations in Granite Pit, Gibraltar Mine.

2008 was the first full year of operation for Cross Lake Minerals Ltd's **QR** mine since the property's acquisition from Kinross Gold Corp in 2004 and renewed production in 2007. The QR property is located about 58 km southeast of Quesnel and about 17 km north of the Mount Polley Mine. Open pit mining ended in July 2008 with the exhaustion of the West Pit, and the operation subsequently moved underground in the Midwest Zone. Startup reserves of about 356 000 tonnes at 5.7 g/t Au allowed for a mine life of about two years, but the company was optimistic that this could be extended. In 2008, about 3500 m of drilling supplemented underground exploration to advance understanding of the deposit. Higher than expected mining costs, and mill modification necessitated by Midwest zone ore feed, set production back. In October 2008, Cross Lake set about reorganizing its affairs with a view to improving the efficiency of its operation and increasing its revenues. Central to the adjustment was giving Procon Mining and Tunnelling Ltd, QR's mining contractor and Cross Lake's largest creditor, a management stake in the operation and appointing Procon nominees to the board.

Northgate Minerals Corp continued operations on its **Kemess** copper-gold mine, located in the Toodoggone area about 300 km northwest of Mackenzie (Figure 3.7). The East and West lobes of the Kemess South open pit are developed in a porphyry deposit within the late Triassic quartz monzonite "Maple Leaf" pluton, and encounter uniform grades throughout. As of end-December 2007, total reserves stood at 51.8 million tonnes grading 0.17% Cu and 0.47 g/t Au. Projected 2008 production was 27 669 tonnes Cu and 5925 kg Au. Concentrate from the 52 000 tonne/day mill is shipped by road and rail to Rouyn-Noranda, Quebec for smelting. In 2008, mining was concentrated in the West Pit, and the East Pit was completely filled-in. The projected mine life is to third quarter 2011.

QUARRIES

Lightweight Advanced Volcanic Aggregates Inc continued small-scale production of lightweight aggregate and scoria from its **Nazko** quarry about 100 km west of Quesnel. Up to 50 000 tonnes/yr have been removed historically from this quarry, with the product used as fill for construction, concrete blocks, barbecue rock and landscaping.

The Chemical Lime Company of Canada Inc operates a **small limestone quarry** about 5 km southeast of Giscome. The quarry appears to have been inactive in 2008, with any shipments from the quarry being from stockpiled material. Within the community of Giscome itself, Canadian National Railway Company continued

Figure 3.7. Moving low-grade ore at the Kemess Mine.

production from its **Giscome** basalt quarry to supply road ballast requirements for maintenance of its main and spur lines. **Hunterstone** Quarries, near Valemont, continued low-level production of talus-derived quartzite dimension stone for specialty construction.

EXPLORATION HIGHLIGHTS

Significant exploration projects in the North-Central Region are listed in Table 3.2. The compilation and the information in the text were assembled prior to the end of the calendar year and contain some estimates of the work done. There were 30 major exploration projects (in excess of about $500,000 in expenditure) – compared to 37 in 2007 – and among that group 19 had 2008 expenditures of $1,000,000 more.

Figure 3.8 offers an estimated breakdown of 2008 expenditures by category (grassroots, early-stage exploration, advanced-stage exploration/deposit appraisal, mine evaluation, and mine property exploration). Because grassroots exploration commonly does not involve exploration permitting, the proportion assigned to this category is likely to be low. For this discussion, early-

TABLE 3.2. SIGNIFICANT EXPLORATION PROJECTS, NORTH-CENTRAL REGION, 2008

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program
Addie 2	Dajin Resources Corp	(093A.043,044)	Au	Mesothermal Vein	A, DD (~2700 m)
Akie	Canada Zinc Metals Corp	094F 031	Zn-Pb-Ag	Sedimentary Exhalative	A, G, DD (6226 m)
Axelgold	Caracle Creek International consulting Inc	093N 096	Au-Sb-Ag-Cu	Epithermal Vein	AB-EM, AB-Mg
Barkerville	Williams Creek Explorations Ltd	(093H.003)	Au	mesothermal vein	DD (~1500 m)
Bodine-Warren	Amarc Resources Ltd	(093N.061,062, 071)	Cu	VMS	A, AB-MG, GC, DD (~1000 m)
Bonanza Ledge/ Cow Mountain	International Wayside Gold Mines Ltd	093H 019	Au	Mesothermal Vein	A, DD (2740 m)
Brewster Lake	Pacific Cascade Minerals Inc	(093F.048)	Mo	Porphyry	IP, DD (2300 m)
Capoose-Silver Trend	Silver Quest Resources Ltd	093F 040	Ag-Au	Disseminated	A, IP, GC, DD (1596 m)
Captain	Orestone Mining Corp	(093J/13)	Cu-Au	Porphyry	IP, MG, DD (1103 m)
Cariboo	Paget Resources Corp	(093A.076,086)	Pb-Zn	Mississippi Valley-type	G, GC, GP
Cariboo Gold	Noble Metal Group Inc	(093A.073,083)	Au	Epithermal Vein	GC
Chu	TTM Resources Ltd	093F 001	Mo	Porphyry	DD (43 000 m)
COL-Magnet	Solomon Resources Ltd	093N 101	Cu-Au	Porphyry	DD (1043 m)
Croy-Bloom	Newcrest Mining Ltd	(094D.050)	Au-Cu-Mo	Porphyry	DD (2473 m)

TABLE 3.2. CONTINUED

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program
Falcon (Takla-Redton)	Geoinformatics Exploration Canada Ltd	093N.017	Mo	Porphyry	A, G, DD (2996 m)
Fran	Yankee Hat Minerals Ltd	(093K.099)	Au-Cu	Alkalic Porphyry	IP, GC
Frank Creek	Barker Minerals Ltd	093A 152	Cu-Zn-Pb	Kuroko-style Volcanogenic Massive Sulphide	A, TR, DD (2375 m)
Frasergold	Hawthorne Gold Corp	093A 150	Au	Mesothermal Vein	G, DD (10 405 m)
G-South	Richfield Ventures Corp	(093G.009)	Au-cu	Vein	A, GP, GC DD (1500 m)
Gibraltar	Taseko Mines Ltd	093B 005-008, 011-013	Cu-Mo	Calk-Alkalic Porphyry	DD (33 528 m)
Hen	Swift Resources Inc	093A 048	Au-Ag-Cu	Volcanogenic Massive Sulphide	A, DD (1205 m)
Hixon Creek	Cayenne Gold Mines Ltd	(093G.048)	Au-Ag	Vein	DD (630 m)
Hoof	Porpoise Bay Minerals Ltd	(093G.081)	Ni-Mg	Ultramafic-hosted bulk tonnage	A, DD (1010 m)
Indata	Eastfield Resources Ltd	093N 192	Au-Ag	Vein/Porphyry	DD (1035 m)
Jan/Tam/Misty	Teck Cominco Ltd	093N 001, 093	Cu-Au	Alkalic Porphyry	DD (1187 m)
Jean	Newstrike Resources Ltd	093N 079	Cu-Mo	Porphyry	A, TR, DD (2105 m)
JD	Duran Ventures Inc	094E 171	Au-Ag	Epithermal vein	G, GC, IP
Kemess South	Northgate Minerals Corp	094E 094	Au-Cu	Porphyry	IP
Kwanika	Serengeti Resources Inc	093N 018, 073	Cu-Au-Mo	Alkalic Porphyry	A, GC, IP, MS, DD (31 742 m)
LaForce	Orestone Mining Corp	(094D.099, E099)	Cu-Au	Porphyry	DD (1000 m)
Lorraine-Jajay	Teck Cominco Ltd	093N 002,066, 224	Cu-Au	Porphyry	DD (5 748)
Lustdust	Alpha Gold Corp	093N 044	Au-Ag-Cu-Zn-Pb	Skarn, Manto, Mesothermal Vein	A, DD (~2400 m)
Manson Creek	Skygold Ventures Ltd	(093N.068)	Au	Vein	A, G, GC, DD (1584 m)
McConnell Creek	GGL Diamond Corp	094D 006	Cu-Au-Mo	Porphyry	A, IP, GC, DD (~1000 m)
Megaton	Northern Rand Resource Corp	(093A.024)	Cu-Au	Porphyry	A, DD (4327 m)

TABLE 3.2. CONTINUED

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program
Mt. Milligan	Terrane Metals Corp	093N 191,194	Au-Cu	Alkalic Porphyry	GC, AB-EM/MG, EN, GD (408 m)
Mount Polley	Imperial Metals Corp	093A 008, 164	Cu-Au	Alkalic Porphyry	G, IP, TR, DD (1314 m)
Mouse Mountain	Richfield Ventures Corp	093G 003	Cu-Au	Alkalic Porphyry	A, GP, GC, DD (1842 m)
Nithi Mountain	Leeward Capital Corp	093F 006-016	Mo	Calk-Alkalic Porphyry	A, EN, MS, DD (10 500 m)
Pinchi	Lysander Minerals Corp	(093N.082)	Cu-Au	Porphyry	IP
Polymet/Bodine	Amarc Resources Ltd	(093N.002, 061)	Au-Cu	Porphyry	GC, IP, MG
Porphyry Pearl	Starfire Minerals Ltd	094E 084	Au	Porphyry	DD (2130 m)
Prince George Porphyry (15 targeted areas)	Xstrata Copper Canada	(93F,G,J, K)	Cu-Au	Porphyry	IP, GC, OB (3418)
QR	Cross Lake Minerals Ltd	093A 121	Au	Skarn	UG, DD (3545 m)
QUEST (27 properties including Q, ST, MP, Copper, Ping, Mil)	Fjordland Exploration Inc/Serengeti Resources Inc	(093B, G, J, K,)	Cu-Au	Porphyry	G, GC, IP, AB-MG
Shasta	Sable Resources Ltd	094E 050	Ag-Au	Epithermal Vein	UG (450 m)
Sheridan	Copper Ridge Explorations Inc	(093B.050)	Cu-Mo	Calc-Alkalic Porphyry	G, GC, IP, MG, DD (1000 m)
Spanish Mountain	Skygold Ventures Ltd	093A 043	Au	Mesothermal Vein	A, GC, DD (40 447 m)
TSUN	Eagle Peak Resources Inc	(093K.077)	Au-Cu	Porphyry	G, IP
Wicheeda	Spectrum Mining Corp	093J 014	Rare earths	Carbonatite	DD (800 m)
Woodjam (Southeast, Takum and Deerhorn Zones)	Fjordland Exploration Inc./Cariboo Rose Resources Ltd	093A 078	Au-Cu-Mo	Calc-Alkalic Porphyry	A, IP, MG, DD (7691 m)

Exploration Category: G = Grassroots, E = Early-Stage, A = Advanced-Stage, ME = Mine Evaluation, MP = Mine Property

Work Program Abbreviations:

A = access (trail, road construction on claims); AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm)= diamond drilling totalling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping etc.; GC = geochemical sampling (rock, soil, silt etc.); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing (primarily for industrial mineral products); MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; R = reclamation; RC = reverse circulation drilling; TR = trenching; UG (Xm) = X metres of underground development; UG-BU= underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

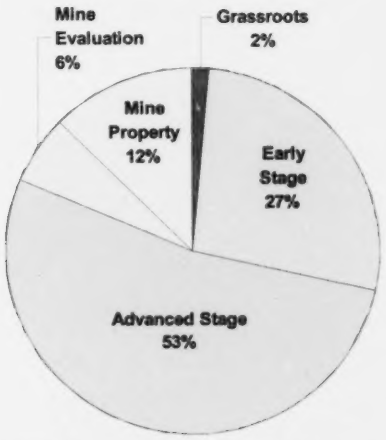


Figure 3.8. 2008 Exploration expenditures by category.

stage exploration is considered as focussed activity based on a deposit model. It may include geophysics, geochemistry, trenching and drilling. Advanced-stage exploration is concerned with resource definition emphasizing drilling, but included may be baseline environmental studies, economic pre-feasibility work, and exploration of secondary targets. Mine evaluation begins with the firm commitment to develop a resource; and concentrates on the environmental, social, engineering and financial assessments of a project. Mine property exploration is on-lease in respect of a producing mine, and is work other than that done within or immediately adjacent to the deposit. Figure 3.3 is a location map of producing mines, major exploration projects, and selected smaller projects in the North-Central Region in 2008.

LIKELY – HORSEFLY AREA

Imperial Metals Corp completed 16 198 m of exploration drilling at and close by its **Mount Polley** mine, supplementing an IP survey, trenching and geological mapping. The on-lease drilling was on the Southeast, Boundary and Northeast (Wight Pit) zones, with a focus on finding high-grade ore in advance of closing the Wight Pit at the end of 2008. One hole, PZ08-22, in the Pond zone (part of the Southeast zone) intersected 75.6 m grading 1.16% Cu, 0.42 g/t Au and 11.70 g/t Ag. This is the only area of skarn mineralization discovered so far at Mount Polley. Within that interval were 8.1 m grading 6.07% Cu, 1.26 g/t Au and 67.32 g/t Ag. Holes in the Boundary zone magnetite breccia were encouraging as well, with hole ND08-51 intersecting 64.5 m grading 1.42% Cu and 1.55 g/t Au. An area adjacent to the Wight Pit, the Kidney zone, also saw rewarding intersections.

Fjordland Exploration Inc, with its 40% partner Cariboo Rose Resources Ltd, concentrated its 2008 activities on the Southeast zone of its **Woodjam** copper-gold-molybdenum porphyry prospect, located about 10 km south of the village of Horsefly. Mineralization is associated with a subvolcanic quartz monzonite intrusion, part of the Triassic-Early Jurassic Takomkane Batholith. Hole WJ-08-84 in the Southeast Zone intersected a high-grade interval, extending for 226.77 m to the end of hole at 356 m, returning 0.93% Cu and 0.40 g/t Au. Indeed, every hole completed to date on the Southeast zone has returned encouraging results, and all have bottomed in mineralization (Figure 3.9). Fjordland also completed reconnaissance drilling on the Takom and newly-discovered Deerhorn zones, with 7400 m being completed in total.

Adjacent to Fjordland's Woodjam property, Northern Rand Resources Corp completed a drilling program of over 4300 m, on similar targets, on its **Megaton** project. The program targeted the "Landing zone," in which copper mineralization and native copper were encountered in several boreholes.

Hawthorne Gold Corp continued work on its **FraserGold** property, located about 65 km east of Horsefly (Figure 3.10). FraserGold is an orogenic lode gold deposit hosted within intensely-deformed Quesnel River Group "knotted phyllite." Particulate gold is described as occurring primarily in quartz segregations of stringers, veins, boudins and mullions. The deposit has been known since the early 1980s, and in 1991 James Askew Associates estimated a resource on the property of 6 million tonnes of mineralized material grading 1.7 g/t Au. In 2008, Hawthorne completed about 10 400 m of diamond drilling, including in-hole geophysics, on the site to define further the resource leading to an expected NI 43-101 compliant estimate. Thirty-one of the 58 holes contained visible gold. Hole 08-330, which intersected 75.29 m grading 0.830 g/t Au, and hole 08-313, which intersected 96.07 m grading 0.771 g/t Au, were particularly impressive.

Nearby and northwest of the FraserGold project Dajin Resources Corp completed about a 2700 m drilling program on its **Addie 2** property. They are exploring a similar gold target to FraserGold.

Figure 3.9. Mineralization in drillhole 08-83, Woodjam property.

Figure 3.10. Marlin Murphy and Kristian Whitehead examine core at the FraserGold project.

Exploration at the **Spanish Mountain** bulk tonnage gold property near Likely, a joint venture of Skygold Ventures Ltd (70%), and Wildrose Resources Ltd (30%), continued at a high level in 2008. Gold mineralization is found as a "sediment-hosted vein" deposit in graphitic argillite-mudstone that has undergone complex deformation locally. Some 40 000 m of drilling were completed on the Main zone to define the resource more accurately (Figure 3.11). Structural controls on mineralization are becoming apparent, and have been used to follow high-grade occurrences along a 1.3 km trend that remains open to the north and south. In April 2008 Skygold released a NI 43-101 compliant resource estimate on a defined "Resource Area" within the Main zone. Within this area, and using a cut off grade of 0.5 g/t gold, an estimated 67.06 million tonnes averaging 0.81 g/t Au in the Measured and Indicated categories, containing 1.75 million ounces of gold, were reported. An updated estimate is expected in early 2009.

Figure 3.11. Drill core grading 33 g Au/tonne, Main Zone, Spanish Mountain.

Barker Minerals Ltd identified its **Frank Creek** prospect as being a Kuroko-style polymetallic sulphide (VMS) deposit, hosted by felsic volcanic rocks. The deposit appears to be on the bottom limb of a large recumbent fold, and consists of veins, disseminations, stringers, semi-massive and massive sulphides that the company interprets as footwall-type stockwork mineralization such that the main deposit would be found at greater depth. In 2008, the company completed a 2375 m drill program to define the deposit more accurately.

MCLEESE LAKE AREA

During 2008 Taseko Mines Ltd conducted extensive on-lease exploration at its **Gibraltar Mine** near McLeese Lake. Some 174 boreholes totalling 33 529 m were completed to test mineralization in East and West pit areas, an area south of the Granite Lake Pit, and also a zone NW of the Gibraltar West Pit ("Gibraltar North") (Figure 3.12). This drill program, along with the 2007 results, form the basis of a new NI 43-101 reserve estimate that was released in December 2008 (see above).

Copper Ridge Explorations Inc completed a 5-hole, 1000 m program southeast of and adjacent to the Gibraltar Mine lease area on its **Sheridan** property. The program was aimed at evaluating coincident chargeability and soil anomalies for copper, but the results were negative.

QUESNEL AND WELLS – BARKERVILLE AREAS

Richfield Ventures Corp continued work on its **Mouse Mountain** alkalic copper-gold porphyry project east of Quesnel, encompassing mineral occurrences distributed along a 1500 m north-northwest trending area in which have been defined, from north to south, the Rainbow, Valentine and High-Grade zones. Disseminated and fracture-controlled pyrite and chalcopyrite mineralization is typical, with malachite and azurite in weakly to moderately potassic and silica-altered Nicola Group volcanic rocks. In 2008, the company completed its 2007 drill program, continuing in 2008 for a total of 1842 m. One hole, RVC 08-19, was drilled to test Rainbow zone mineralization at depth. It intersected 236 m averaging 0.12% Cu and 0.051 g/t Au, within which a 20 m interval averaged 0.36% Cu. The zone remains open at depth.

Richfield also completed a four-hole, 1818 m drill program on its **G-South** prospect, a gold-bearing massive sulphide vein network located approximately 5 km north of Mouse Mountain. While elevated gold and base metal values were encountered in some sections, more work will be required to determine the economic significance.

Figure 3.12. Drill pad reclamation at Gibraltar. (The barrier is to prevent runoff into the nearby wetland.)

In the Wells-Barkerville area, International Wayside Gold Mines Ltd continued work on its **Bonanza Ledge** mesothermal vein gold deposit, completing some 2740 m of drilling in 10 boreholes on the Goldfinch zone extension and nearby **Cow Mountain**. The company intends to develop a seasonally-operated small open pit mine at Bonanza Ledge. Meanwhile, the Environmental Assessment process for International Wayside's nearby proposed **Cariboo Gold** mine remains underway. Cariboo Gold is a vein and replacement gold deposit also proposed for exploitation by open pit mining.

Just to the southeast of International Wayside's tenure, Williams Creek Explorations Ltd completed a drilling program on the **Barkerville** prospect on its Westport property. The company is seeking a possible continuation of the Bonanza Ledge deposit, or other gold-bearing quartz vein zones.

SOUTHERN NECHAKO PLATEAU

TTM Resources Inc's **Chu** prospect is located about 75 km southeast of the Endako mine and 80 km south-southwest of the community of Vanderhoof. The deposit comprises an area of molybdenite-mineralized sedimentary rock adjacent to a granodiorite intrusive stock, with molybdenum showing as a quartz-molybdenite veinlet stockwork in hornsfelsed siltstone (Figure 3.13). The mineralized zone extends for about 2 km in a northwest direction, has been shown by drilling to be about 300 m wide and 650 m in depth, and is open at depth and to the southeast. In February 2008, TTM released a NI 43-101 compliant resource estimate for the deposit, in which an indicated resource of 57.1 million tonnes of 0.104% Mo with a cutoff of 0.08% Mo, and an inferred resource of 44.4 million tonnes of 0.100% Mo with a cutoff of 0.08% Mo, were identified. In October 2008 a Preliminary Economic Assessment indicated a "viable open pit mineable resource," and posited a 60 000 tonne/day operation spanning 31 years. During 2008, 99 boreholes were completed totalling about 48 000 m, and also an extensive 3D-IP survey. The Preliminary Assessment recommended continued drilling to upgrade the resource estimated from "inferred" and "indicated" to "indicated" and "measured."

Silver Quest Resources Ltd completed IP and geochemical surveys and a five-hole, 1596 m diamond drill program on its **Capoose-Silver Trend** property, located about 50 km west of the Chu deposit and 142 km by road from Vanderhoof (Figure 3.14). The company is exploring a potentially large disseminated silver-gold deposit, with minor lead and zinc, hosted by intermediate to acidic garnetiferous volcanic and sedimentary rocks. Results released to date, for two holes, were positive. Hole 89 intersected 16 m grading 57.3 g/t Ag and 0.32 g/t Au, and Hole 97 intersected 88 m grading 40.3 g/t Ag and 0.2 g/t Au. The company plans to complete an updated resource estimate during the first quarter of 2009.

Pacific Cascade Minerals Inc completed an IP survey and followed-up with a 2300 m drill program at its Brewster Lake property, east of the Capoose and north of the Chu projects, but encountered no significant molybdenum mineralization. The company is following up with an analysis of the results to direct further exploration.

In early 2008, Leeward Capital Corp completed an extensive drill program, begun in 2007, on its **Nithi Mountain** porphyry molybdenum deposit. The deposit is located south of the community of Fraser Lake, and about 18 km east of the Endako molybdenum mine. Molybdenite mineralization at Nithi occurs in a potassically-altered quartz monzonite (Nithi Mountain Phase) of the late Jurassic to Early Cretaceous Francois Lake plutonic suite. Several mineralized zones cover an area about 2 by 4 km and are at least 200 m in depth.

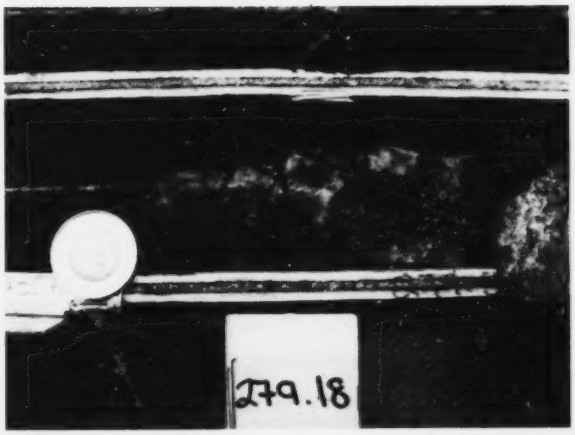


Figure 3.13. Molybdenite selvage with quartz in argillite, Chu project.

Figure 3.14. Drill rig at Capoose project, courtesy Silver Quest/David Pawliuk.

The 2008 program, of 42 holes totalling 10 500 m, focussed on the Delta zone, with preparatory work on the Theta and Sigma zones; and succeeded in identifying a new high-grade area within the Delta zone anomaly. A NI 43-101 compliant estimate received in February 2008 for the Gamma zone identified an inferred resource of 84.3 million tonnes grading 0.028% Mo using a 0.020% Mo cutoff. In late September, Leeward published an inferred resource estimate for the combined Gamma and Delta zones of 165.25 million tonnes grading 0.026% Mo with a cutoff at 0.020% Mo.

Porpoise Bay Minerals Ltd followed-up preliminary work in 2007 with a 10-hole, 1000 m drilling program on its **Hoof** project about 20 km south of Vanderhoof. The company is exploring altered ultramafic rocks of the Cache Creek Complex for magnesium and/or nickel in a bulk-tonnage setting.

PRINCE GEORGE AND MACKENZIE AREAS

The Prince George and MacKenzie areas saw two major regional projects in 2008, both of them following-up the results of Geoscience BC's 2007 QUEST (Quesnellia Exploration Strategy) project. As a joint venture, Fjordland Exploration Inc and Serengeti Resources Inc examined 27 properties by airborne magnetics, geochemical sampling, and IP surveys. Six of these, **Q, ST, MP, Copper, Ping** and **Mil**, were selected as priority targets for further work. **Mil**, located about 15 km southwest of Mt. Milligan, in particular was identified as a drill target. Xstrata Copper Canada completed over 100 km of IP survey on 15 properties comprising its **Prince George Porphyry** project, and also nearly 4000 m of Pionjar drilling to sample the regolith just over bedrock.

NORTHERN NECHAKO PLATEAU

Terrane Metals Corp's **Mt. Milligan** project, located about 155 km northwest of Prince George, continued to be the main focus of interest in the northern Nechako Plateau. The deposit is hosted by the Witch Lake succession within the Takla Group, and is characterized by augite-phyric volcaniclastic and coherent basaltic andesites with subordinate epiclastic beds. These in turn are intruded by the Mount Milligan Intrusive Complex of coeval Takla and post-Takla monzonites and related rock types (Figure 3.15). The property comprises an alkalic porphyry copper-gold deposit with measured and indicated resources of 590.8 million tonnnes grading

Figure 3.15. Jim Logan examining core at Mt. Milligan.

0.193% Cu and 0.352 g/t Au. Processing ore at a nominal 60 000 tonnes/day, a mine life in excess of 15 years is forecast. The capital cost of the facility is estimated at $917 million. During the construction phase up to 700 workers could be employed and, after opening, ongoing employment could be about 400. Terrane plans an updated feasibility study report for late 2009, to guide project implementation in the context of the operating and capital costs pertaining at that time. Meanwhile, the Environmental Assessment review process, permitting, and pre-construction activities will continue uninterrupted. During 2008, exploration on the **Mt. Milligan** property was limited to geochemistry and a HeliGEOTEM magnetic-electromagnetic survey.

South of Mt. Milligan, Orestone Mining Corp continued work on its **Captain** copper-gold porphyry prospect, with a program that included extensive IP, magnetic and geochemical surveys supported by over 1000 m of drilling. Holes 08-01 and 08-05 in particular returned encouraging values for both copper and gold.

Newstrike Resources Ltd completed a 2105 m drilling project, begun in 2007, on its **Jean** porphyry copper-molybdenum property located on the southern margin of the Jean-Marie stock about 45 km southwest of the Kwanika project. The property has been the subject of exploration since the discovery of the prospect in 1968, and historical estimates suggest that substantial tonnages of copper and molybdenum may be present at favourable grades.

Eagle Peak Resources Inc completed an extensive IP survey on its **TSUN (Tas)** gold-copper porphyry prospect about 32 km northwest of Fort St. James.

Amarc Resources Ltd undertook an extensive program of silt and soil sampling, IP, and airborne magnetics on its **Bodine-Warren** and **Rapid** VMS properties (including about 1400 m of diamond drilling at Bodine-Warren), located southwest of Leo Creek near the south end of Takla Lake, and northwest of Stuart Lake respectively. No results have been released as of yet.

OMINECA MOUNTAINS

Teck Cominco Ltd (formally to become "Teck" in April 2009 and now "branded" as Teck) continued drilling on its **Lorraine-Jajay** and **Jan/Tam/Misty** projects northwest of Germansen Landing. The company is exploring alkalic copper-gold porphyry deposits in the Duckling Creek Syenite Complex, with mineralization typically of disseminated chalcopyrite and lesser bornite in the syenitic and biotite pyroxenite phases. During 2008 Teck completed over 5700 m of drilling at Lorraine-Jajay, by way of follow-up on its Lower Main, Bishop and TooGood targets from 2007, and on 6 new targets including All Alone Dome North, Target X and Page Bowl. At Jan/Tam/Misty the company completed about 1200 m of drilling on its 2007 targets Boundary and Slide, and on one new target.

Serengeti Resources Inc continued to delineate its **Kwanika** porphyry copper-gold-molybdenum deposit in the Quesnel terrane, about 40 km east of Takla Landing and 85 km north of Mt. Milligan. In 2008, Serengeti completed some 30 000 m of drilling, along with geochemistry and IP; and results continue to be impressive. Three mineralized zones, South, Central and North, have been investigated so far by over 55 000 m of drilling. The mineralized system is oriented in a north-northwest direction for up to 750 m in length and 200 m across, and is up to 500 m deep. In the Central zone, hole K-114 returned 0.98% Cu and 1.24 g/t Au over an interval of 94 m (Figure 3.16); and hole K-113 intersected 0.5% Cu and 0.9 g/t Au over 483 m. In the South zone, hole K-110 intersected 54 m assaying 0.34% Cu and 0.76 g/t Au. By late 2008, initial metallurgical testing was underway on a representative sample to predict copper-gold recoveries. A resource estimate is expected early in 2009.

Alpha Gold Corp completed about 2400 m of drilling on untested targets within its **Lustdust** property, about 5 km north of Serengeti's Kwanika deposit. The program was aimed at testing for continuity of gold-copper mineralization from Kwanika. Alpha Gold is still awaiting a NI 43-101 report on the Canyon Creek Skarn and Skarn Extension, which were explored in 2006 and 2007. These complex skarn, replacement zone and vein deposits are

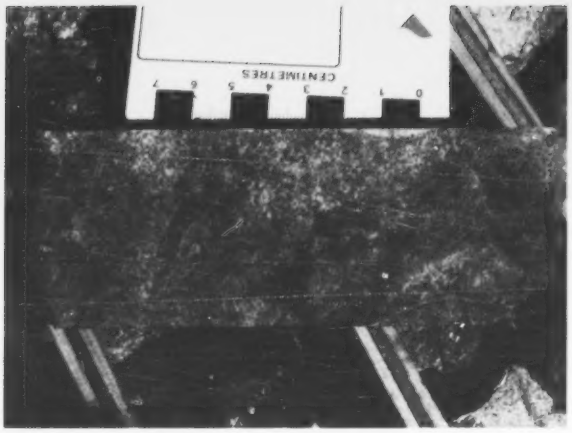


Figure 3.16. Native Copper in drillhole K-08-114, 252 m, Kwanika project.

characterized by gold-copper-silver mineralization hosted in limestone and phyllites of the Cache Creek Terrane proximal to the Pinchi Fault.

Eastfield Resources Ltd completed an IP survey and a 1035 m drilling program on its **Indata** property south of Tsayta Lake. The company is exploring a set of polymetallic (gold-silver) mesothermal veins, and a possible porphyry copper deposit, that has seen sporadic activity over the past 20 years. Recent encouraging soil geochemical and IP results spurred the 2008 program.

In January 2008, Geoinformatics Exploration Inc announced that the first two holes drilled in 2007 on its **Falcon** prospect just north of Tchentlo Lake had encountered encouraging molybdenum values in a "highly-altered and porphyry-related mineralized system" on the west side of the Hazen Batholith. Two holes, drilled 400 m apart in 2007, returned 346 m grading 0.059% MoS_2 in the first, and 144 m grading 0.093% MoS_2 and 137 m grading 0.066% MoS_2 in the second. The company followed-up in 2008 with rock and soil geochemistry on the prospect, and a further 3 000 m of drilling in which visible molybdenite was encountered in all eight holes.

TOODOGGONE – KEMESS AREA

Northgate Minerals Corp scaled its 2008 exploration program back drastically from 2007, when its focus had been in developing prospects related to the proposed Kemess North mine. The 2008 program was entirely related to possibly of extending the life of the **Kemess South** mine, which otherwise would be exhausted in mid-2011. The company completed an IP survey on grid north of the tailings dam, which might lead to a 2009 drill program.

Milling of silver-gold ore from Sable Resources' underground **Shasta** mining/exploration operation, located about 30 km North of the Kemess Mine, began in early 2008 as a seasonal operation. Most recently, underground development was concentrated in the Creek Zone, in a gently-dipping set of quartz veins and stockwork zone having a strike length of over 800 m. Results on the Creek zone were erratic, however, and better results were obtained in the D and JM zones. Ore is processed at the Baker Mill, about 11 km distant.

During 2008, Starfire Minerals Ltd continued a drilling program on its **Porphyry Pearl** gold property, located about 55 km north of the Kemess South Mine. Starfire completed a six-hole, 2130 m program and released the results of the first of these holes, which intersected 140 m grading 0.67 g/t Au. Porphyry Pearl is underlain principally by Hazleton Group volcanic rocks of the Early Jurassic Hazelton Group and includes two styles of mineralization: porphyry-type gold-copper disseminations and fracture-fillings in an altered granitic host, and epithermal vein and disseminated base and precious metals.

Early in 2008, GGL Diamond Corp completed a VTEM (Versatile Time-domain ElectroMagnetic) airborne survey of its **McConnell Creek** property located about 30 km southeast of the Kemess South mine. This was followed by an extensive IP survey, geochemical sampling, and a diamond drilling program of about 1000 m, aimed at locating possible copper-gold porphyry mineralization.

Newcrest Mining Ltd carried out about 2500 m of diamond drilling on its **Croy-Bloom** gold-copper-molybdenum porphyry deposit prospect, optioned from Serengeti Resources Inc, south of the Kemess Mine and McConnell Creek.

GATAGA – KECHIKA TROUGH

In September 2008, Mantle Resources changed its name to Canada Zinc Metals Corp. The company continued intensive exploration of its **Akie** sedex lead-zinc-silver project, located about 250 km northeast of MacKenzie and 50 km north of the north end of Williston Lake. The property is underlain by folded shales and siltstones of the Upper Devonian Gunsteel Formation. The mineralized zone is up to 30 m thick and is characterized by finely laminated sphalerite, galena and pyrite within a thicker pyrite-barite unit. The 2008 project involved 6226 m of heli-supported drilling, with 12 holes on the Cardiac Creek zone and 2 on the North Lead zone (Figure 3.17). Considerable effort also went into constructing a mainline road almost 9 km in length, and some 3.7 km of trail, in the interest of improving access for future exploration. In June 2008, a NI 43-101 compliant report on the property identified an inferred resource of 23 595 million tonnes grading 7.60% Zn, 1.50% Pb, and 13.0 g/t Ag in a "relatively continuous zone." The 2008 drill program was an outcome of that report, and confirmed an up-dip extension of the Cardiac

Figure 3.17. Drilling the North Lead deposit, Akie project.

Creek deposit in excess of 100 m, and an extension along strike to the southeast of about 100 m. As currently defined the deposit is now at least 1 km in length and 550 m downdip.

OUTLOOK FOR 2009

The year 2008 was a financially unsettled one for the exploration industry. Some companies curtailed or cancelled their programs on the basis of funding issues, but the major players remained present with high levels of activity. While other metals declined substantially in price, gold remained in excess of $700 US/oz. Attractive gold prices should make for a continued high level of interest in developing properties in the North-Central Region. In the final analysis, the mineral sector will no doubt do better as the economy recovers.

Government and First Nations are working towards revenue sharing and other agreements that, once in place, could provide a more certain context for exploration and mining activity.

ACKNOWLEDGMENTS

The writer acknowledges with thanks the support of staff in the Prince George Regional Office, and in particular Mines Inspectors Victor Koyanagi and Marnie Marchuk for critically reading an early draft of this report. In the Geological Survey Branch, Tania Demchuk and Dave Lefebure provided valuable suggestions and feedback.

SOUTH-CENTRAL REGION

By Bruce Madu, PGeo
Regional Geologist, Kamloops

SUMMARY AND TRENDS

Exploration activity in South-Central BC decreased in 2008 to approximately $68 million compared to last year's record high (Figure 4.1). This value, however, exceeds totals for many years prior to 2007. The transition of the New Afton project from exploration status through to a development project almost entirely explains the gap between the two years' totals.

Drilling activity is estimated at about 279 000 metres (Figure 4.2) a decrease of 15% from 2007. The number of significant projects, *i.e.* those with drilling or trenching and over $500,000 in spending or significant regional impact, is estimated at 25. As in previous years, projects that were completing pre-feasibility and feasibility level studies - those requiring large amounts of capital as part of an advanced exploration effort - constitute over one-half of the cumulative total (Figure 4.3).

Junior companies were responsible for virtually all of the region's investment which is the ongoing trend seen for many years now. Fewer large financings were reported in the year compared to last year and it appeared many companies were funding 2008 programs with previous years' financings.

Higher metal prices for most of the year continued to influence exploration strategies with companies primarily targeting bulk-mineable copper-gold, copper-molybdenum and molybdenum porphyry deposits, high-grade gold-silver veins, and stratiform polymetallic massive sulphide deposits. In some of these projects, the potential mining envelopes are much greater at current commodity prices and "super pits" are proposed that incorporate mined out areas and newly drilled off resources. This scenario is well demonstrated at the **Copper Mountain** (copper-gold) and **Afton** (copper-gold) (Ajax, DM-Audra-Crescent) projects where considerable success has been achieved in defining new resources in mature camps. Porphyry copper-gold targets are perennial favorites in this region and this was shown by the **Lac La Hache**, **Taseko Lake**, **Taseko**, **Rateria**, **Prime-Man**, **Logan Copper** and **Miner Mountain** projects. Also noteworthy is the high level of molybdenum exploration, which is tracking both the price of the metal and the province's abundant opportunities for the metal. Significant programs for molybdenum were carried out at the **Crazy Fox**, **Isintok Lake**, **Empress**, **Copeland** and **Rabbit South** properties. Precious metals were explored for at the **Bralorne Mine** (gold), **Panorama Ridge** (gold), **Prospect Valley** (gold-silver),

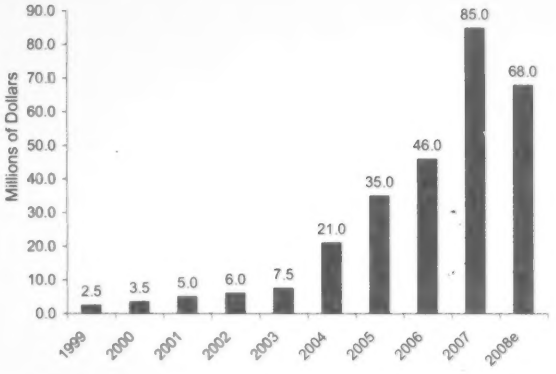


Figure 4.1. Annual exploration spending, in millions of dollars, South-Central Region.

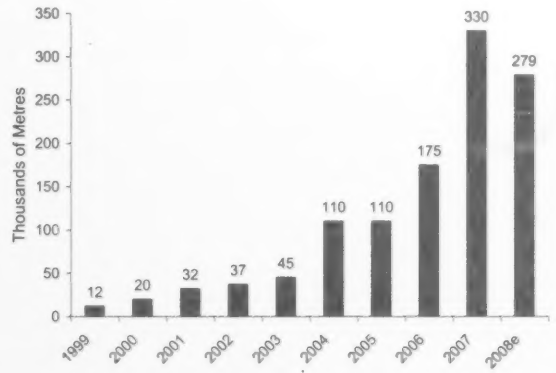


Figure 4.2. Annual exploration and development drilling, in thousands of metres, South-Central Region.

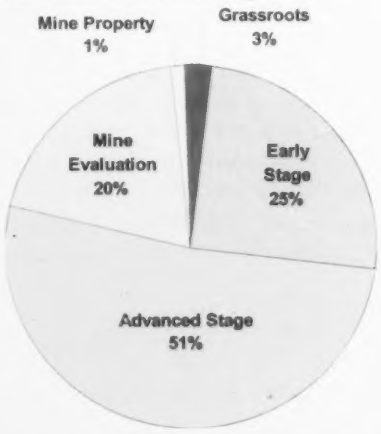


Figure 4.3. Annual exploration expenditures divided by exploration stage, South-Central Region.

and **Reliance** (gold-silver) projects. Stratiform polymetallic massive sulphide deposits were explored for at the **J&L** (zinc-lead-silver), **CK** (zinc-lead-silver), and **Cottonbelt** (lead-zinc-silver) projects.

Two projects in the South-Central Region are now engaged in the Environmental Assessment process: the **Prosperity** (copper-gold) and **Harper Creek** (copper) projects. Both saw a large amount of engineering work during the year as well as baseline work in support of the permitting process.

Several projects saw their largest exploration campaigns to date and undertook advanced exploration and feasibility level studies. These include the **Blue River** (tantalum-niobium) and **Ruddock Creek** (zinc-lead-silver) projects.

Amongst the operating mines, **Highland Valley Copper** continues to make a major capital investment in pit expansion, equipment procurement and on site improvements aimed at extending the mine's life to 2019. Mine development at the **New Afton** (copper-gold) project continued at an accelerated pace for most of 2008 with underground development and surface construction supporting the proposed start-up of mining late in 2009. This has since been delayed owing to current economic conditions.

All of the operating mines in the region are listed in Table 4.1 and shown on the map (Figure 4.4). In addition, the major exploration projects are listed in Table 4.2.

It appeared to be a slower year for reported discoveries in the South-Central Region. This may simply reflect this author's ability to connect with those individuals or companies that are making discoveries. At the **Blue River** (tantalum-niobium) project a new carbonatite body called the **Felix** has been reported. Northeast of Lac La Hache, a new zone of copper-gold porphyry mineralization has been reported at the **Bluff Lake** property.

At the **Rateria** copper-molybdenum property, drill results from Zone A appear to be a breakthrough discovery for the project. New copper and gold mineralization has been outlined at the **Miner Mountain** property at the South Zone and at a new gold-bearing caliche to the northeast of the Granby Zone. The Bonanza Trench at the **Panorama Ridge** property defines a new high-grade style of gold mineralization at this particular property. A magnetite skarn has been discovered at the **Iron Mist** project which is under current evaluation.

It is encouraging to see that most of the discoveries announced last year saw more exploration in this year.

METALS

Highland Valley Copper, a partnership of Teck, formerly Teck Cominco Ltd (97.5%), and Highmont Mining Company Ltd (2.5%), continues to invest a large amount of capital and operations time towards the 2019 mine plan (Figure 4.5). At the operation, equipment is fully engaged in a multi-year stripping program aimed at the east wall push back at the Valley pit. For the next several years strip ratios will be nearly 1:1. Most equipment procured for continued mining is in place; the west wall push back is awaiting the amendment of the mine plan. Capital investment for 2008 is estimated at $175 million. The operation employs 1015 workers.

Average daily mill throughput is estimated at around 121 000 tonnes/day or approximately 44 million tonnes for the year which is an increase of roughly 9% from 2007. Copper production is estimated at 114 000 tonnes compared to an actual production of 139 500 tonnes for 2007. Molybdenum production is forecast at around 1600 tonnes which is down from the actual production of 1860 tonnes in 2007. The lower production numbers are in part attributed to the greater portions of lower grade ore being mined from the Lornex pit which also realizes lower recoveries due to its higher clay content. The mine also produces minor by-product gold and silver.

On the heels of receiving a Mine Permit in the fall of 2007, New Gold Inc immediately began developing the **New Afton** porphyry copper-gold mine on the northwestern end of the Iron Mask batholith and centered on the former Afton open-pit mine site ten kilometres west of Kamloops (Figure 4.6). A business combination with Peak Gold Ltd and Metallica Resources Inc in mid-2008 created an intermediate mining company with more financial depth and producing mines. During 2008 an estimated $165 million was proposed to be spent preparing the underground workings for block-cave mining as well as site preparation for the 11 000 tonne per day mill. Mill commissioning was on schedule for a late 2009 start up. De-watering at the Afton pit was proposed to occur throughout the year with the excess water to be pumped into the nearby Pothook pit. Citing capital market volatility and the company's current cash position a decision was made not to fast track development of the project. Under the revised plan, surface construction is to be suspended until the end of 2010 with full production to

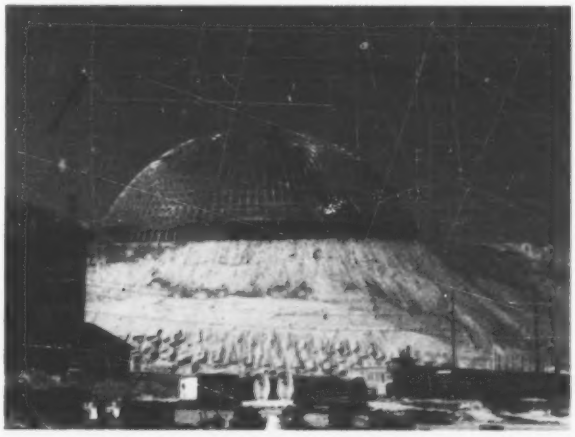


Figure 4.5. Geodesic domes over ore stockpiles being installed at the Highland Valley Copper mine near Logan Lake.

be reached in the second half of 2012. Underground development at a reduced rate will continue until the bottom of the orebody is reached. A participation agreement with the Kamloops and Skeetchestn Indian bands was completed in March 2008 which provides for educational, employment, contracting and financial opportunities for the bands.

Several other mine-mill complexes remain on care-and-maintenance status. Many of these have been closed since the mid-1990s, awaiting higher metal prices and/or discovery of additional ore. They have permits and substantial infrastructure in place and represent opportunities for renewed mining or custom milling. These complexes include the **Goldstream** copper-zinc, **Blackdome** gold-silver, and **Bralorne** gold mines. Efforts at bringing these mines back into production are discussed in latter sections.

COAL

Located near the town of Coalmont, the small **Basin** thermal coal mine of Compliance Energy Corporation sold minor amounts of high volatile, bituminous B and C rank coal in 2008 from stockpiles.

INDUSTRIAL MINERALS

There are more than 15 industrial mineral quarries and processing plants employing over 250 people in the region. These operations provide stable jobs in many small to medium-sized communities including Kamloops, Kelowna, Lillooet, Cache Creek, Ashcroft, Princeton and Merritt. There are very good opportunities for additional growth in this sector due to the wide variety of rock types

TABLE 4.1 SOUTH-CENTRAL REGION FORECAST MINE PRODUCTION 2008

Mine	Operator	Deposit Type / Commodity	Forecast Production in 2008 (tonnes or kilograms)	Number of Employees	Proven and Probable Reserves (at Jan. 1, 2008)
Metals					
Highland Valley Copper	Teck Cominco Ltd / Highmont Mining Company Ltd	Calcalkalic porphyry Cu-Mo	114 000 Mt Cu, 1600 Mt Mo, minor Au and Ag	1015	451 000 000 Mt at 0.38% Cu and 0.007% Mo
Coal					
Basin	Compliance Energy Corp	Thermal coal	0	On care and maintenance	
Industrial Minerals					
Ashcroft	IG Machine and Fiber Ltd (IKO Industries Ltd)	Basalt (roofing granules)	~350 000 Mt	55 (plant & quarry)	
Bud	Absorbent Products Ltd	Bentonite		see Red Lake	
Buse Lake	Lafarge Canada Inc	Volcanic ash (alumina-silica)		see Harper Ranch	
Craigmont	Craigmont Mines Joint Venture	Magnetite tailings	60 – 70 000 Mt	~30 (plant; seasonal)	
Decor	Pacific Bentonite Ltd	Alumina, landscape rock		~2 (including trucking)	
Falkland	Lafarge Canada Inc	Gypsum	6000 Mt	see Harper Ranch	
Harper Ranch	Lafarge Canada Inc	Limestone	~220 000 Mt	32 (plant & 3 quarries)	
Kettle Valley quarries	Kettle Valley Stone Company	Ashlar, flagstone, thin veneer		~40 (plant & quarries)	
Pavilion	Graymont Western Canada Inc	Limestone	190 000 Mt	~34 (plant & quarry)	
Red Lake	Absorbent Products Ltd	Diatomaceous earth		40 (plant & 3 quarries)	
Zeotech Bromley Creek	Heemskirk Canada Ltd	Zeolite			

Figure 4.4. Mines, quarries and major exploration projects, South-Central Region, 2008.

TABLE 4.2 MAJOR EXPLORATION PROJECTS, SOUTH-CENTRAL REGION, 2008

Property	Operator	MINFILE	Commodities	Deposit Type	Work Program
Tulameen Platinum	Goldcliff Resource Corporation		Pt	Ultramafic hosted	P, G, GC, AB-GP (1533 km)
Afton Area (West Ajax, East Ajax, DM-Audra-Crescent)	Abacus Mining and Exploration Corp	092INE012, 13, 28, 30, 26	Cu, Au, Ag, Pd	Alkalic Porphyry	DD (~48 000 m), PF
Blue River Tantalum/Niobium (Upper Fir, Fir, Switch Creek)	Commerce Resources Corp	083D 005, 35	Ta, Nb	Carbonatite	DD (~20 000 m), A, BU (10 000 T), TR, R
Bralorne Camp (BK Zone)	Bralorne Gold Mines Ltd	092JNE164, 1	Au, Ag	Mesothermal Vein	DD, GC, UG (~200 m)
Crazy Fox	Newmac Resources Inc	092P 014, 15, 106	Mo, W	Porphyry	DD, TR
Harper Creek	Yellowhead Mining Inc	082M 008, 9	Cu, Ag, Au, Zn, Mo	Stratiform disseminated	DD (~20 000) EN, FS
Isintok Lake	Jasper Mining Corp	092HNE100, 276	Ag, Cu, Mo	Porphyry	DD (~3900 m)
Lac La Hache (Aurizon, Peach Lake, Peach Melba, Ann North, Spout Lake, North and South Zones)	GWR Resources Inc	092P001, 2, 34, 35, 108, 120, 153	Cu, Au	Porphyry	DD (~20 000 m), TR, IP
Panorama Ridge	Goldcliff Resource Corp	082ESW052, 259	Au	Skarn	A, DD (6180 m), TR (1081 m)
Prospect Valley (Discovery South and North)	Spire Gold Corp		Au, Ag	Epithermal Vein	DD (11 200 m), TR, P, G
Prosperity	Taseko Mines Ltd	092O 041	Cu, Mo, Au	Porphyry	GD (660 m), ES, FS
Rabbit South	Global Hunter Corp	092INE045, 147, 130, 114, 71	Cu, Au, Mo	Porphyry	DD (3709 m)
Rateria	Happy Creek Minerals Ltd	092ISE092, 150, 60	Cu, Mo	Porphyry	DD (4000 m), IP, MAG
Reliance	Menika Mining Ltd	092JNE033	Au, Sb, Ag	Mesothermal Vein	DD (3000 m)
Ruddock Creek	Selkirk Metals Corp	082M 082, 83	Zn, Pb, Ag	Stratiform	UG (1150 m), UGDD (6000 m), A, BS, ES,
Taseko Lake	Galore Resources Inc		Cu, Mo, Au, Ag	Porphyry	G, P, GC, DD (5000 m)
J & L	Merit Mining Corp	082M 003	Zn, Pb, Ag, Au	Stratiform / VMS	UG (~500 m), EN
Cottonbelt	International Bethlehem Mining Corp	082M 086 (near)	Pb, Zn, Ag, Cu	Broken Hill Type SEDEX	DD (3000 m), GP
Logan Copper	SNL Enterprises Ltd	092ISE012, 190	Cu, Mo, Ag	Porphyry	DD(~3000 m)
Miner Mountain	Sego Resources Inc	092HSE078, 203	Cu, Au, Ag	Porphyry	TR (3200 m), G, GC, DD (~1200 m)
Copper Mountain	Copper Mountain Mining Corporation	092HSE001, 24	Cu, Au	Porphyry	DD (60 000 m), FS
CK	CMC Metals Ltd	082M224, 137, 225-228, 245-251	Zn, Pb, Ag	Stratiform / Broken Hill	TR, DD
Taseko	Great Quest Metals Ltd	092O033, 38	Cu, Mo, Au	Porphyry	DD (1567 m)
Copeland	Torch River Resources Ltd	082M 002	Mo	Skarn	DD (~3850m)
Prime-Man	Bearclaw Capital Corp		Cu, Au	Porphyry	DD (~2500 m), TR (~2000 m)

Work Program Abbreviations:
A = access; trail, road construction on claims; AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totaling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping, etc; GC = geochemical sampling (rock, soil, silt, etc); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing-primarily for industrial mineral products; MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = Pilot plant, R = reclamation; RC = reverse circulation drilling; TR = trenching, UG (X m) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

Figure 4.6. Panorama of the New Afton mine development of New Gold Inc just outside Kamloops showing major areas of work.

and deposits in the region, excellent transportation infrastructure, proximity to growing markets in western North America, and the relative ease of permitting.

The **Harper Ranch** limestone quarry of Lafarge Canada Inc continue to supply cement to meet strong demand in western Canada. Lafarge draws materials from the **Kamloops** cement plant and the **Falkland** and **Buse Lake** quarries, which provide gypsum and alumina-silica rock respectively.

The **Decor** pit of Pacific Bentonite Ltd supplies alumina-rich burnt shale to the Lafarge cement plant in Kamloops. The shale beds occur directly above the Hat Creek coal deposit, located west of Cache Creek. Although most of the material is sold to Lafarge, other marketing opportunities exist such as surfacing of baseball diamonds. The property is also known to host a large bentonite deposit which is being investigated for municipal engineering and tile manufacture applications.

Also near Cache Creek, Graymont Western Canada Inc operates the **Pavilion** limestone quarry and lime plant on the Pavilion Indian Reserve. Graymont has a forty-year lease with the Ts'kw'aylaxw First Nation who form the bulk of the employees at the mine.

East of Ashcroft, IG Machine and Fiber Ltd, a subsidiary of IKO Industries Ltd, operates the **Ashcroft** basalt quarry and roofing granule plant. The granules are sized and coated with one of several distinct colours on site, and then shipped by rail and truck to IKO asphalt shingle plants in Calgary, Alberta; Sumas, Washington; Chicago, Illinois and elsewhere in North America.

Craigmont Mines Joint Venture operates the **Craigmont** magnetite operation located near Merritt where tailings from the old Craigmont copper mine are processed. The plant normally operates on a seasonal basis (March to December), however, due to strong demand, processing may continue through the winter months in 2009. The magnetite is used in coal washing plants in western Canada and the Centralia mine in Washington State. Remaining tailings are forecast to be exhausted within the next one to two years and the company is evaluating several other possible feed sources.

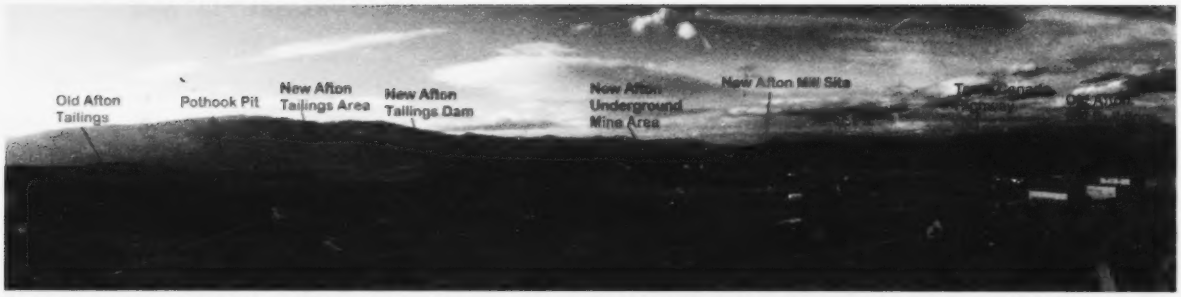
At its plant in Kamloops, Absorbent Products Ltd manufactures cat litter, barn deodorizer, industrial absorbents, and carriers for agricultural products. These are prepared from diatomaceous earth mined from the **Red Lake** quarry northwest of Kamloops, and bentonite mined from the **Bud** quarry at Princeton.

The **Z1** (Ranchlands) zeolite quarry near Cache Creek is a small intermittent producer. Heemskirk Canada Ltd continues to market agricultural and absorbent products, produced from stockpiled zeolite at its plant in Lethbridge, Alberta. Zeolite is also mined from the nearby **Z2** quarry by Industrial Mineral Processors, a private company based in Calgary. The plant produces industrial absorbents for oil field clean-up, soil conditioner, barn deodorizers, feed binders, and cat litter.

At Princeton, the **Zeo-Tech/Bromley Creek** zeolite quarry is operated by Heemskirk Canada Ltd who transports the material to Lethbridge and prepares it for use as lightweight cement for oil and gas wells.

Opal Resources Canada Inc produces attractive fire opal gemstones and jewelry from the **Klinker** property, located west of Vernon. Opal occurs as fracture and vesicle-fillings in andesitic to basaltic laharic breccia of the basal Kamloops Group (Eocene). Presently the gemstone jewelry is marketed from a retail store in Vernon and is aimed at the BC tourist market; however, the company aims to develop other North American markets.

Decorative rock and dimension stone are produced at numerous small quarries throughout the region. The best known producer is the Kettle Valley Stone Company of Kelowna which sells flagstone, ashlar, facing stone and landscape rock mined from the **Nipple Mountain**, **Kettle Valley**, **Canyon** and **Gemini** quarries. Kettle Valley's workforce has grown to about 40 people year round, mainly employed in the Kelowna processing facility. The products include dacite ash, gneiss and basalt, and are mainly used in high-end residential and commercial developments in the western U.S.A. and in the Vancouver-Whistler area.



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South of Revelstoke, D.G. Olsson produces, by hand, small amounts of micaceous-quartzite flagstone and facing stone at the **Begbie** quarry. Other small, hand-operated flagstone quarries exploit micaceous quartzite in the North Thompson area.

EXPLORATION HIGHLIGHTS

SOUTH THOMPSON AND THOMPSON RIVERS (KAMLOOPS – LOGAN LAKE – HIGHLAND VALLEY)

At the **New Afton** project of New Gold Inc, a Titan geophysical survey was completed in August aimed at exploring the potential continuation of the Iron Mask batholith below the Tertiary volcanics that define the northerly boundary of the Afton pit. Little work was done in 2008 to further explore the C-Zone and Deep C which are more than 1350 m in depth below the surface at the mine site and roughly 200 through 500 metres below the current reserves. A letter of intent was signed in November 2007 with neighboring company Abacus Mining and Exploration Corp around the Ajax pits (Figure 4.7). The agreement gives New Gold Inc access to deep mineral resources - below a conceptual pit being contemplated by Abacus - and gives the latter a much enlarged land position to explore.

Figure 4.7. Common access road to the Ajax pits area where a recent joint venture between these companies has been signed.

Abacus Mining and Exploration Corp concentrated on its new ground in and around the **Ajax West** and **East** pits (Figure 4.8). Drilling between November and April of over 30 000 m has given the company a substantial amount of new information that it will incorporate into a global resource calculation anticipated late in 2008. Results such as hole AN-07-004, which intersected 356.1 metres grading 0.37% Cu and 0.22 g/t Au, illustrate the significance of the joint venture ground to the company's advancement of this project. A preliminary economic assessment is proposed as well whereby the company will examine the potential to develop a 60 000 tonne per day copper and gold open pit operation at the site.

The company also released results from late 2007 drilling of the Monte Carlo area, which lies east of the Ajax pits, and may represent a faulted offset of the orebody. More drilling is required to better understand the area, but results such as an intersection of 116.5 metres of 0.36% Cu and 0.21 g/t Au in hole AM-07-001 provide encouragement to further explore this area. Drilling of the DM and Rainbow zones in previous campaigns is reported to have confirmed an inferred resource in these zones of 60.1 million tonnes at a 0.2% Cu cut-off.

Other active properties around the Iron Mask batholith that saw minor amounts of work include: the **GM** claim group of Gold Mask Ventures Ltd, the **Galaxy** property of Discovery-Corp Enterprises Inc and the **K-CR** property which has been optioned to Christopher

Figure 4.8. Drilling at the Ajax East pit near Kamloops by Abacus Mining and Exploration Corp.

James Gold Corp and renamed the **Copper Creek** project.

With funding from the Targeted Geoscience Initiative (**TGI-3**), the Geological Survey of Canada completed its multi-parameter airborne geophysical survey over the immediate Kamloops area to provide southern coverage contiguous to the 2006 Bonaparte survey.

Near Roper and Dominic Lakes, west-southwest of Kamloops, Global Hunter Corp completed fourteen holes at the **Rabbit South** molybdenum porphyry property. Previous work outlined a horseshoe-shaped mineralized zone associated with quartz monzonite of the Roper Lake stock where it intruded andesites and basalts of the Nicola Group. The bulk of the drilling was within areas of known mineralization and aimed at confirming previous drill results in support of defining the resource to a modern standard. Early lab results have shown elevated rhenium levels accompanying the molybdenite mineralization as seen in Hole RS-D-08-123 which intersected 91.8 metres of 0.07% Mo and 0.13 g/t Re. The company has reanalyzed 2005 and 2007 drill core pulps to further explore the significance of rhenium at the property.

Mine site exploration occurred during the year at the **Highland Valley Copper** mine, which is centered in the

Guichon Creek batholith, where Teck drilled several targets aimed at supporting the expansion plans at the mine. Work was undertaken at the Highmont pit and beneath the proposed west wall push back at the Valley Pit.

About 12 kilometres southeast of the Highland Valley mine, Happy Creek Minerals Ltd had a breakthrough year at the **Rateria** porphyry copper-molybdenum property. Drilling at Zone A intersected 177 metres of 0.366% Cu with a higher grade intersection of 42 metres of 0.865% Cu, 0.012% Mo and 4.36 g/t Ag in hole R08-05. Geological evidence suggests to the company that Zone A is part of a 5 kilometre corridor that has potential for similar levels of mineralization.

Just north of the Highland Valley mine, Getty Copper Inc continues to work on a pre-feasibility engineering study at the **Getty North** and **Getty South** porphyry copper deposits. Early in the year the company updated its stated resources and included estimates for contained molybdenum. The Company is proposing to utilize concentrate pressure oxidation and tailings vat leaching hydrometallurgical technology in its anticipated treatment of its resources. The project would produce cathode copper and molybdenum trioxide.

Further south in the Guichon batholith, Dot Resources Ltd completed additional geophysics at the **Dot** property, which contains the former producing Aberdeen Mine and Vimy showings, to define more drill targets. Last year's drill results were released and expanded both the southeast and northwest zones and suggested the zones may be in fact a singular mineralized horizon.

SNL Enterprises Ltd was active on the **Logan Copper** project located six kilometres east of the Highland Valley Copper mine. The property is reported to cover the Bethsaida phases of the Guichon batholith. The company completed a large MMI sampling and reconnaissance program and has drilled numerous combined geochemical and geophysical anomalies.

NORTH THOMPSON RIVER – ADAMS LAKE (CLEARWATER – BLUE RIVER)

Commerce Resources Corp undertook its most concerted effort to date at its **Blue River** tantalum and niobium project (Figure 4.9). With the intention of completing a scoping study in early 2009, the company proceeded with bulk sampling of the Upper Fir for metallurgical studies as well as a 20 000 metre drill campaign (Figure 4.10). The company released a new resource estimate for the Upper Fir with an indicated resource of 14.68 million tonnes at 190 g/t Ta_2O_5 and 1300 g/t Nb_2O_5 and inferred resource of 19.81 million tonnes of 188 g/t Ta_2O_5 and 1612 g/t Nb_2O_5 at a 150 g/t Ta cutoff. Significant intersections of carbonatite encountered in the 2008 drill campaign should see the resources at the Upper Fir increase. The company aggressively undertook a regional exploration program in search of new carbonatite bodies as well as extensions to known ones: the company reported the discovery of the **Felix** carbonatite as one success of this program.

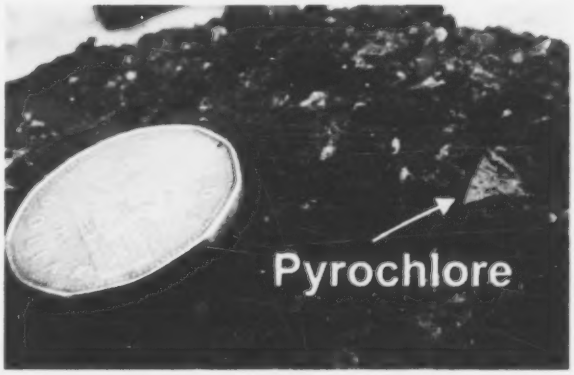

Figure 4.9. Pyrochlore expressing prominently in a sample of weathered carbonatite at the Blue River Tantalum and Niobium project.

Figure 4.10. Drill core logging at the Blue River Tantalum and Niobium project of Commerce Resources Corp.

Selkirk Metals Corp continued a very aggressive program at the **Ruddock Creek** property located within the Script Ranges about 100 kilometres north of Revelstoke. Most of the company's efforts were directed at driving a decline toward the E-Zone. At 956 metres the footwall of the E-Zone was intersected and for the next 22 metres the company was able to get its first

comprehensive look at the zone. Further work has indicated that the decline, which ultimately reached 982 metres in length, does not traverse the entire width of the zone, estimated at 30-40 metres. The decline would have to be extended another 60 metres to achieve this. A 170 metre crosscut was completed at the end of the decline and four drilling stations were created. A bulk sample has been collected from the zone for ongoing metallurgical studies and advanced engineering and geological studies have been completed.

A substantial underground drill program was completed to infill and confirm the significant intersections from the previous surface drilling (Figure 4.11). Hole EUG-08-5 has produced one of the best results to date in intersecting 11.09 metres of 13.17% Zn, 2.32% Pb and 3.1 g/t Ag. The hole experienced drilling difficulties, as did several of the holes early in the program, such that some of the thickest parts of the mineralized horizon were not completely crossed. Results are pending for a significant number of the holes completed later in the fall drilling campaign. The company has announced it will proceed with a preliminary assessment of the project and in particular complete resource calculations for the portions of the E-Zone that have been adequately tested.

Inlet Resources trenched and drilled the **Broken Hill** property near Avola and 15 kilometres west of the Ruddock Creek property. At the property numerous Broken Hill-type zinc-lead-silver stratiform showings are found within calc-silicate sequences. Work was focused on the Mike and Denis showings which are sphalerite-bearing float and geochemical soil anomalies respectively. Drilling tested between the Navan and Pautler showings as well.

After completing its discovery hole CF07-41 in November 2007, Newmac Resources Inc has set out to define the extent of its new zone at the **Crazy Fox (Anticlimax)** porphyry molybdenum-tungsten property north of Little Fort (Figure 4.12). Piercing the zone from the east and west has shown that it extends over 800 metres to the south from where it was first encountered. Drillhole CF-08-57 intersected 305.9 metres of 0.04% Mo and 0.001% W with a higher grade interval of 78 metres of 0.06% Mo. Often holes finish in mineralization due to the greater depths required to drill off the zone and technical limitations of the drills.

At the **Harper Creek** copper project located 10 kilometres southwest of Vavenby, private company Yellowhead Mining Inc has filed a project description with the BC Environmental Assessment Office indicating its intention to move the project toward permitting. The deposit is comprised of tabular shaped zones of volcanogenic sulphide mineralization hosted within highly deformed Late Devonian metavolcanic rocks of the Eagle Bay Assemblage. At present the deposit contains an indicated resource of 450 million tonnes grading 0.323% Cu and an inferred resource of 142 million tonnes grading 0.326% Cu, both at a 0.2% Cu cut off.

Figure 4.11. Underground drilling of the E-Zone at Selkirk Metals Corp's Ruddock Creek project northeast of Avola (courtesy of Jay Fredericks).

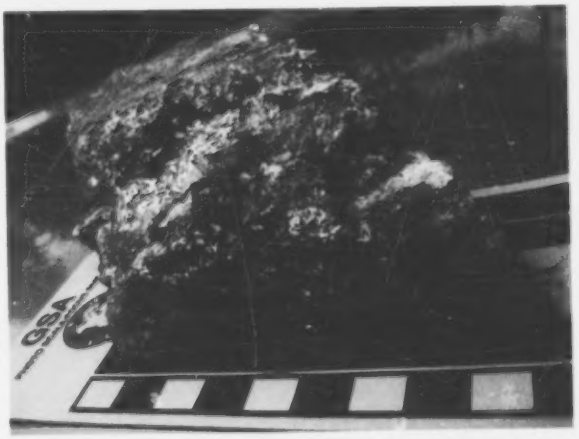

Figure 4.12. Sample of molybdenite-bearing quartz vein in a float sample at the Crazy Fox property of Newmac Resources Inc near Little Fort.

The company completed its fourth phase of drilling in April and undertook a targeted geological program at the property. Much of the remainder of the year was spent re-logging and sampling core from previous drilling by Noranda and US Steel to obtain multi-element analysis and confirm prior results (Figure 4.13). Engineering studies are underway with respect to a mine design as well as field studies related to wildlife and environmental characterization. A memorandum of understanding has been signed with a Korean group to provide investment and future project financing rights to see the project through upcoming milestones.

Several other projects were active in the Adams Plateau with most exploring for volcanogenic massive sulphide mineralization within the highly prospective Eagle Bay Assemblage. On the **Moore** property near East Barriere Lake, Almo Capital Corp drilled targets identified by a previous induced polarization survey.

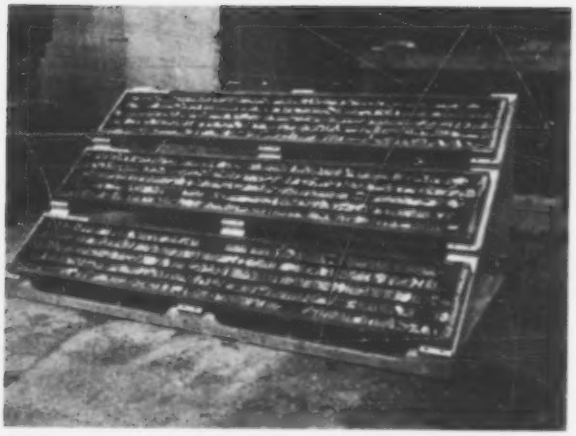

Figure 4.13. Old core being readied for re-logging at Yellowhead Mining Inc's Harper Creek project near Vavenby.

Figure 4.14. Core logging at the CK project of CMC Metals Ltd located between Clearwater and Blue River along the Raft River

Eagle Plains Resources Ltd was back at the **Acacia** property near Adams Lake this year completing an airborne geophysical survey. Two recent copper and silver discoveries made at the **Honeymoon** property by prospector David J. Piggin were optioned to Acrex Ventures Ltd who undertook more grassroots exploration of this large land holding near the Harper Creek project and west of Adams Lake. Southeast of Barriere, Bitterroot Resources Ltd advanced its **SPN** project with further geological and geochemical work as well as an airborne VTEM survey.

CMC Metals Ltd drilled the **CK** property located northeast of Clearwater to provide infill and confirmation data at the New Zone which has been traced over a strike length of 1300 m and to depths of over 100 metres downdip (Figure 4.14). This property boasts numerous mineralized occurrences of the Broken Hill-type and the company proposes to move the project quickly through to a small-scale high-value mine. Results from winter 2007 drilling have been released with the best intersection reported in hole CK07-10 which cut 1.78 metres of 4.44% Pb and 22.32% Zn.

Partners Island Arc Exploration Corp and Rimfire Minerals Corporation released results for a 2007 winter drill program at the **Jake** property, a 2005 gold discovery by prospector Mo Kaufman which is located west of Clearwater. At the property mineralization consists of quartz with pyrrhotite, chalcopyrite, pyrite and bismuthinite in veins and stingers hosted by sheared andesite tuffs of the Devonian to Permian Fennell Formation. Drilling of induced polarization anomalies and trenched areas confirmed gold mineralization in several structures including the original Jake showing and the Jake Offset. Hole J-DDH07-04 intersected 1.25 metres of 11.34 g/t Au close to the surface at the Jake showing. Further induced polarization surveys were conducted in 2008 with proposed drilling to follow.

West of Little Fort, Candorado Operating Company Ltd trenched and drilled the **Deer Lake** property in search of skarn and porphyry copper-gold mineralization. Two zones, the Road Showing and the Lightning Zone were the primary focus of this year's program. In 2007, drilling of hole DL07-10 at the Lightning Zone yielded several short intersections grading between 0.03 - 0.49% Cu and 0.16 - 1.06 g/t Au and an impressive interval of 1.0 m grading 2.2% Cu and 8.10 g/t Au. Nearby, Christopher James Gold Corp was active on their area properties conducting geological and geochemical studies and trenching. Several deposit styles are being pursued within Nicola Group volcanic rocks especially skarn mineralization similar to Candorado's property to the south. Black Panther Mining Corp has optioned and drilled the **Golden Loon** property just west of Little Fort. The company is pursuing nickel and cobalt mineralization within the Dum Lake Intrusive complex: a Triassic to Jurassic Alaskan-type ultramafic intrusive.

Kingsman Resources Inc followed up on last year's encouraging drill results on the **Luxor** property that yielded several intersections of 3 - 32.75 m with grades of 0.0214 - 0.0925% Mo in four holes with an expanded geophysical survey and geochemical and biogeochemical surveys. The company is targeting molybdenum mineralization within intrusive rocks of the Baldy batholith.

While searching for gold mineralization on the **Iron Mist** property located north of Kamloops, American Creek Resources Ltd identified the source of a large magnetic airborne anomaly to be a massive magnetite skarn. The company reports exposures of up to 1 metre width and 15 metres length have been found. The company is exploring the nature of the magnetite as a potential source of iron.

SOUTHERN CARIBOO – CHILCOTIN PLATEAU (TASEKO LAKES – 100 MILE HOUSE)

Exploration for porphyry copper-gold deposits was the focus of most work in the Cariboo-Chilcotin in 2008; however, the area is also well known for its high-grade gold-silver vein prospects. Both the provincial and federal geological surveys continued their geoscience programs in the region aimed at bolstering exploration activity and off setting the impacts of the Mountain Pine Beetle on the area's economy (Figure 4.15). Mitch Mihalynuk of the British Columbia Geological Survey and his crew completed regional mapping in the Puntzi Lake area to expand the area covered in 2007 that led to the discovery of five new mineral occurrences that year and a map pattern that showed there was far more Mesozoic rocks exposed in the area than previously known with potential for various styles of mineralization. In the same region, a till sampling and surficial mapping program was started by Travis Ferbey of the provincial Geological Survey.

The most significant project in this area is the **Prosperity** porphyry gold-copper deposit of Taseko Mines Limited, located southwest of Williams Lake. The deposit contains 487 million tonnes of proven and probable reserves at 0.22% Cu and 0.43g/t Au. The company continues with engineering studies and has completed new metallurgical work to confirm the character of ore feed. Some mill equipment with long lead times for procurement has been secured with payments. In July the project formally entered the Environmental Assessment process.

At the **Taseko Lake** porphyry copper, gold and molybdenum project, located 15 km south of the Prosperity project, Galore Resources Inc picked up where it left off last season with a significant drill program. The majority of the drilling was at the Hub property where hole 08TSK-06 was mineralized over its entire 305 metre length and returned 294 metres of 0.14% Cu and 0.01% Mo. Also drilled were the Northwest Copper, Mad Major, Syndicate and Spokane prospects.

Figure 4.15. Mitch Mihalynuk of the BC Geological Survey undertaking field studies in the Beetle Impact Zone west of Williams Lake.

Nearby, Great Quest Metals Ltd drilled in and around the Empress deposit at the **Taseko** property in an effort to update historical resources and expand the deposit. The company reports that there were an increased number of dikes in this year's drilling compared to the main part of the Empress deposit to the west. This interrupted some of the longer mineralized intersections.

At the **Chilanko** property located north of Tatla Lake, Newmac Resources Inc reported interesting geological environments from a winter drill program at the property despite a lack of economic levels of mineralization. Intersections of native copper, chalcocite and bornite mineralization are reported to be similar to a red bed-style of deposition. In the spring an IP program was undertaken to further delineate targets through windows in the Miocene age basalts which cover most of the plateau area.

The **Blackdome** gold-silver mine and mill of J-Pacific Gold Inc is located northwest of Clinton and remains on care and maintenance. This underground mine operated in the 1980s and again briefly from October 1998 to May 1999. Mineralization consists of narrow, high-grade epithermal quartz veins. The 200 tonne-per-day mill is intact and the property has an historic inferred mineral resource of 124 120 tonnes grading 12.8 g/t Au and 33.7 g/t silver. Nearby, the company also holds the **Elizabeth** property where bonanza-grade mesothermal veins within the Blue Creek diorite intrusions are common. This year saw a break from the very active programs of the past few years as the company complied information and planned for upcoming programs.

Anglo-Canadian Uranium Corp released drill results from 2007 drilling at the **Stirrup** property located west of Clinton where epithermal gold-sulfide-quartz veins are hosted within marine sedimentary rocks of the Lower Cretaceous Jackass Mountain group. Intersections that ranged from 1.0 to 4.0 metres grading 0.59 - 4.87 g/t Au indicated some higher grade mineralization, but did not support the objective of defining a bulk tonnage target.

At the **Watson Bar** property north of Lillooet, Durfeld Geological Management Ltd continued a program of high-grading gold-silver-bearing mineralization in preparation for custom milling. At the property, quartz-sulphide veins and carbonaceous shear zones are hosted within feldspathic and volcanic lithic arenites of the early Cretaceous Jackass Mountain Group.

At the **Lac La Hache** porphyry copper-gold property of GWR Resources Inc, 2008 marks the 20th year of exploration at the property for the company (Figure 4.16). Work continued at the Aurizon zone on the Ann 1 property which is now better understood to be hosted by a hydrothermal breccia pipe that plunges steeply to the north within a larger zone of potassic-altered monzonite. Drilling at the Aurizon Zone is ongoing in an effort to model the extents of mineralization and perform a

Figure 4.16. Alain Plouffe of the Geological Survey of Canada continued field research in the Lac La Hache region. He is shown here measuring ice flow directions at the Lac La Hache project of GWR Resources Inc.

resource estimate. About 1 kilometre west of the Aurizon zone, the 2007 discovery of the **Peach 1** zone on the Ann 2 property was followed up with 22 drillholes which encountered mineralization over 300 metres in an east-west orientation. Unlike the Aurizon zone, mineralization in this zone is hosted within volcanic rocks that are in turn cut by monzonite dikes at the margin of a monzonite pluton.

Candorado Operating Company Ltd reports a discovery of copper-gold porphyry mineralization at the **Bluff Lake** property immediately north of GWR's property. Prospecting discovered a mineralized float boulder which contained 1.49% Cu and 8.1 g/t Ag. Follow-up drilling of geophysical and geochemical targets encountered mineralization including disseminated and fracture-controlled native copper as well as chalcopyrite, bornite and molybdenite. Assays are pending. Also in the area, drilling of the **Summer** property was proposed by operator Rio Minerals Ltd.

Happy Creek Minerals Ltd continued to evaluate the extensive and prospective holdings it has in the Boss Mountain area of the south Cariboo region. Regional scale potential has been demonstrated at the **Fox** tungsten-molybdenum skarn where 2007 drilling yielded intersections that ranged from 0.25 - 5.0 metres of 0.33 - 1.56% WO_3 and 0.5 - 1.7 metres of 0.51% Mo. Adjacent to the former Boss Mountain mine are the company's **Silverboss** and **Gus** properties which are being explored for seemingly discreet molybdenum and gold-silver mineralized systems associated with the Takomkane batholith. The company is also pursuing alkalic gold-copper porphyry mineralization at the **Hen, Hawk and Grey** properties located southeast of Boss Mountain.

Skygold Ventures Ltd drilled the **Spanish Creek** property this year as part of its search for sediment-hosted gold in similar geological settings to its flagship Spanish Mountain property. Located northeast of Canim Lake, the property has a history of very large gold-in-soil anomalies within Triassic black phyllites that are stratigraphically equivalent to those at the Spanish Mountain property.

GOLD BRIDGE – BRALORNE – LILLOOET

The most advanced project in the famous Gold Bridge mesothermal gold-quartz vein camp is at the **Bralorne** mine of Bralorne Gold Mines Ltd which operated continuously from 1928 to 1971 and was the dominant contributor to the approximately 4.15 million ounces of gold that came from this camp. Infrastructure on the property includes extensive underground workings, an assay lab, mine offices and dry, a partially completed tailings pond and a small gravity/flotation pilot mill with a capacity of about 100 tonnes-per-day.

In 2008, the company extended its underground workings to the BK Zone, an unexplored gap between the King and Bralorne Mines which was discovered in 2007. Drifting along the 800 level, the zone was delineated in two mineralized areas: the first section running for a length of 40.84 metres and giving a weighted average grade of 28.89 g/t Au across an average width of 1.66 metres, and the second for a length of 24.69 metres and giving a weighted average grade of 18.0 g/t Au across an average width of 1.21 metres. To date drifting along the BK Zone has covered approximately one-third of the distance proposed and permitted. A new 440-metre decline has been proposed to intersect the BK Zone at the 575 level and allow further drifting along the structure. This will better define the zone and support shrinkage mining if adequate resources are delineated. The company has also undertaken a surface drilling program to further explore the structure of the BK zone.

Covenant Resources Ltd was active on its **Piebiter** property located six kilometres southeast and along strike from many of the structural zones of the Bralorne camp. The property hosts numerous recorded mineral occurrences and a large multi-element soil anomaly that remains untested.

The **Congress** gold property of Levon Resources Ltd is located 11 kilometres north of the Bralorne mine and on the north side of Carpenter Lake. The property has had some mining and substantial exploration between 1913 and 1989 including six adits with over 2300 metres of underground workings. In late 2007, a drill program was undertaken in the Gun Creek canyon aimed at testing the bulk tonnage potential of porphyry-style stockwork veins associated with dacite dikes and sills. The program revealed that the stockwork veins did not continue to depth and that mineralization encountered was similar to typical vein mineralization at the property. The best intercept came from a zone of rusty-weathering carbonate-quartz-arsenopyrite-stibnite veins that yielded 12.3 g/t Au over 3 m.

East of the Congress property near Marshall Lake, Gray Rock announced no significant mineralization was

encountered in the 2007 drill program on the **Silver Stream** property; however, recent chip sampling of shear zones at the property netted a 1 metre interval of 10.37 g/t Au along with highly anomalous lead and silver.

On the south side of Carpenter Lake and 10 kilometres northeast of the Bralorne Mine, Menika Mining Ltd drilled the Carter claim on the **Reliance** property. The program targeted a large MMI gold-silver-arsenic-antimony in soil anomaly.

Goldbridge Mining Ltd planned to trench and drill the **Little Gem and Jewel** property located northwest of Gun Lake. The Little Gem portion of the project is a gold-cobalt vein deposit within granitic rocks of the Coast Range igneous complex and has seen underground work in the mid-1950s. The company hopes to expand the known mineralization to outside of the high-grade pod that was subject to past work. The Jewel property is a high-grade gold vein and has seen surface exploration in the past.

Also northwest of Gun Lake, Durfeld Geological Management proposed an access and drilling project at the **Eldorado** property in the Nea Basin near the headwaters of Tyaughton Creek.

Cresval Capital Corp was busy on two properties it holds in the area: the **New Raven** and the **Bridge River Copper** projects. The New Raven project is a gold-quartz vein prospect located 15 km southwest of Lillooet. Work in the early 1990s followed up on float samples that assayed up to 12.21 g/t Au and identified five zones through trenching and shallow drilling. The company drilled the property this year with the aim of exploring deeper and at steeper angles in previously explored localities that were felt would benefit from better drilling geometry. At the Bridge River Copper project, located 40 km west-northwest of Goldbridge, the company explored for calc-alkaline porphyry copper-molybdenum-gold mineralization within the Bridge River Pluton. The property contains the Nichol, Russnor and BR showings.

Supreme Resources Ltd drilled the **Ample-Goldmax** property located nine kilometres southwest of Lillooet. Previous work has defined Mother Lode-style mineralization with quartz-carbonate-arsenopyrite-gold veins within greenstones and phyllites along a regional-scale fault zone. Visible gold is not uncommon at the property and reported in several instances in this year's drilling as well.

FRASER RIVER (CACHE CREEK – ASHCROFT – LYTTON – MERRITT)

Several programs were aimed at low-sulphidation epithermal gold-silver targets in the maturing Spences Bridge gold belt, located between Merritt, Spences Bridge and Lytton. Senior project geologist Larry Diakow of the British Columbia Geological Survey has completed another season of field research within mid-Cretaceous rocks of the Spences Bridge Group in an area southwest of Merritt. In 2007, he identified intriguing sinter-exhalite horizons with geochemically anomalous metal contents hosted by Late Triassic Nicola Group strata. In 2008, he expanded 1:20 000-scale mapping of Cretaceous stratigraphy northwest and southeast of previous work to include geology around low sulphidation epithermal veins at the Prospect Valley prospect and new vein prospects at Shovelnose Mountain.

Consolidated Spire Ventures focused most of its efforts at the **Prospect Valley** property this year on the Discovery South and North zones (includes RM/RMX anomalies). Improved access to the property, located 30 kilometres west of Merritt, will allow more economical infill drilling in support of outlining a low-grade bulk-mineable target. Drilling at the Discovery zones in 2007 produced promising results such as 66.83 m averaging 0.9 g/t Au and 5.86 g/t Ag in hole DDH-2007-02. The company is also exploring the Bonanza zone to the south of the Discovery zones. Previous work identified a large area with quartz veins and stockwork within an amygdaloidal basalt host: the same rock types that, when combined with early faulting and hydrothermal alteration, host most mineralization at the property. Float samples within the Bonanza zone have assayed up to 43 g/t Au.

Nearby, Williams Creek Explorations Ltd remained active on the **Merit** property where they proposed to drill targets on Sullivan's Ridge.

Strongbow Exploration Inc focused the majority of its efforts at its Spences Bridge Gold Belt holdings on the **Shovelnose** property located 30 kilometres south of Merritt. Several recent discoveries on the property were further explored through progressive exploration leading up to trenching at the Line 6 and Mik showings. The best result was a 6.0 metre composite chip sample from the Line 6 showing that assayed 5.1 g/t Au in trench L6-XT-04. Gold mineralization is reported to be epithermal-style and related to shallow to moderately west dipping colloform-banded quartz veins hosted by silicified and clay altered felsic volcanic rocks. The company was not active on most of its other properties in the Belt. Results were released for last year's drilling at the Deadwood showing on the **Skoonka Creek** property where intersections ranged from 0.82 - 16.26 metres with grades of 0.42 - 6.43 g/t Au. Drill results from the **Ponderosa** property were disappointing and no further work has been completed.

Appleton Exploration Inc reported success trenching gold-in-soil anomalies at the **Dora** property located southwest of Merrit and between the Shovelnose and Prospect Valley projects. At the property trenching results of brecciated and silicified rhyolite with lesser andesite has produced results such as 2.74 g/t Au over 4 metres as seen in the F2 zone as well as 2.54 g/t Au over 2 metres in the F1 zone. Fall drilling of priority targets was proposed.

Anglo-Canadian Uranium Corp reported that its early 2008 drilling of the **Skoonka (B4, B5, B6)** project in

search of epithermal mineralization returned disappointing results.

SIMILKAMEEN RIVER (ASPEN GROVE – PRINCETON – HEDLEY)

This part of the region saw a dramatic rise is exploration activity mainly focused on porphyry copper-gold-molybdenum prospects. Anchoring this area is the former **Similco** (Copper Mountain-Ingerbelle) copper-gold mine at Princeton which has been on care and maintenance since 1996. Senior project geologist Nick Massey of the British Columbia Geological Survey has begun a research and mapping program within the area aimed at exploring the western Nicola Group as a potential host for massive sulphide-style mineralization. These rocks have experienced significant deformation and may be a different suite of rocks with higher potential for hosting this style of mineralization.

The largest drilling program in the province was undertaken at the **Copper Mountain** project of Copper Mountain Mining Corporation (Figure 4.17). Mineralization at the project is characterized as structurally controlled alkalkic porphyry copper hosted within upper Triassic-Jurassic Nicola Group volcanic rocks of the southern Quesnel terrane. In the fall of 2007 a geophysical survey utilizing a Quantec Titan 24 Deep Earth Imaging system was completed: it proved to be a very effective tool in identifying substantial areas of high-chargeability both near the surface and at depth. Some 60 000 metres drilling followed in a progressively aggressive campaign that built upon its successes as the year went on. The bulk of the drilling was centered on defining the proposed "super pit" resource which incorporates previously mined Pits 1, 2 and 3. The deep roots to mineralization were demonstrated in drillholes, such as CM08P3-08. It ended in mineralization at a depth of 922 m below the bottom of Pit 3 and intersected 292 m of 0.55% Cu and included 98 m of 1.31% Cu. Two zones outside of the proposed super pit were drilled, the Pit 2 West Copper King and the Oriole zones. Both zones have the potential to add significant resources to the project with intersections such as 119 m of 0.40% Cu in hole CM08P2-140 and 36 m of 2.1% Cu and 22.7 g/t Ag in hole CM08OL-17 respectively.

A positive feasibility study was completed in July for Copper Mountain which contemplated a 35 000 tonne per day mill be constructed at an estimated $402 million capital cost. In the study the measured and indicated resource was stated as 169 million tonnes averaging 0.411% Cu and an inferred resource of 84 million tonnes averaging 0.344% Cu, all at a 0.25% Cu cut-off. Another achievement was the completion of a Memorandum of Understanding with Mitsubishi Materials Corporation which sees all the copper concentrate forward sold for the first 10 years of operation in exchange for an equity interest in the project and the arrangement of $250 million project loan. In late October, the company announced it was proceeding with the development of the Copper Mountain project with the placement of long lead time equipment orders and re-establishment of site permits and improvements. Production start-up is anticipated in late 2010 subject to the company finalizing all financing, construction and permitting requirements.

Just four kilometres to the northeast of Princton is the **Miner Mountain** property of Sego Resources Inc (Figure 4.18). Mineralization is generally hosted within microdiorite of the Nicola Group and there may be a genetic link to Deer Valley Fault to the west that juxtaposes these volcanic rocks with sedimentary rocks of the Eocene Princeton Group. Previous work on the Granby Zone has delineated an historic resource of 540 000 tonnes of predominantly oxide ore which grades 0.25 - 0.30% Cu. Starting last year, the company completed a very large trenching program aimed at bettering results of previous shallow cat trenching and exploring the relationship between the Granby and Regal Zones (Figure 4.19). Some of the best results released include 19 metres of 1.03% Cu and 0.25 g/t Au as seen in trench 22 over the Granby Zone. Drilling at both zones was undertaken. At the Granby Zone, typical grades encountered in trenching were reproduced in drilling; however, some of the better intersections such as 64.24 metres of 0.46% Cu, 0.14 g/t Au and 2.25 g/t Ag in hole MM-08-04 were stopped in mineralization due to difficult ground. The Regal Zone was confirmed as being a debris slide that has a potential origin from the Granby Zone to the east-northeast. Some new mineralization has been described at the South Zone located roughly 850 m to the south of the Regal Zone. Re-trenching at the zone has produced results, such as 32 m of 0.29% Cu and 1.0 g/t Au from Trench 36. Another new zone includes a

Figure 4.17. A panorama shot of the previously mined pits at the Copper Mountain project of Copper Mountain Mining Corporation south of Princeton (courtesy of Nick Massey).

Figure 4.18. A geologist with Sego Resources Inc prospects the Miner Mountain property just outside of Princeton.

Figure 4.19. Geologists Stephanie McQueen and Curt Kauss review trenching plans at the Miner Mountain property just outside of Princeton.

gold-bearing caliche to the northeast of the Granby Zone. Both of these new zones appear to reflect second order fault-controlled mineralization from the Deer Valley Fault.

Approximately five kilometres south of the Copper Mountain project, Anglo-Canadian Uranium Corp drilled a single hole on the Friday property at the **Princeton Copper** project to test the contact of the Copper Mountain intrusions with Nicola Group volcanic and sedimentary rocks for copper-gold-palladium mineralization. The company has expanded its holdings in the area in light of current activity in the region.

Located 36 kilometres north of Princeton, Candorado Operating Company Ltd increased its share in the **Man/Prime** porphyry copper-gold property and proposed late fall drilling and trenching. Near Kentucky Lake, Bold Ventures Inc released drill results from last year's drilling at the **Kentucky Lake** property. The company tested the Tom Cat showing to reproduce historical results and encountered mineralization over 44.5 m in hole K07-03; however, incomplete sampling yielded only shorter intervals such as 5.6 m of 0.53% copper. East of Kentucky Lake, Victory Resources Corporation drilled the **TOE & WEN** properties to test for gold-copper mineralization in a mesothermal quartz vein and porphyry copper mineralization respectively. Drill results near an old adit on the Toe property encountered chalcopyrite and pyrite mineralization that gave a near surface intersection of 1.0 m of 8.6 g/t Au and 0.24% Cu in hole VRW-08-02. Results at the Wen property included a small number of short, very low-grade copper intersections. Christopher James Gold Corp flew an airborne magnetic-radiometric survey over its **Big Kidd** property located near Aspen Grove this year.

Southwest of the village of Tulameen, along the Tulameen River, Huldra Silver Inc is proposing a small mine at the **Treasure Mountain** vein silver-lead-zinc project. This year the company restated the resources at the property to include 38 114 tonnes with 1018.95g/t Ag, 5.92% Pb and 5.09% Zn of indicated resource in the Hangingwall Domain, which also contains an inferred resource of 50 990 tonnes with 922.53 g/t Ag, 3.2% Pb and 4.9% Zn.

Goldcliff Resources Corp acquired the mineral rights over portions of the Tulameen ultramafic complex this year with the creation of the **Tulameen Platinum** property. They completed an airborne geophysical survey as well a large stream sampling program in search of gold, platinum and palladium mineralization. Also in the area, private company Magnetite Ridge Metals & Mining Ltd have excavated a bulk sample to test magnetite mineralization within clinopyroxenite for a potential starter pit on its **Magnetite Ridge** property. Potential uses for the magnetite include iron smelter feed and as a coal cleaning medium.

Goldcliff Resources Corp continued it exploration of the **Panorama Ridge** gold skarn project a few kilometres east of the historic Nickel Plate gold mine at Hedley. The property has numerous showings with wide zones of near-surface low-grade gold mineralization hosted within sedimentary rocks of the Hedley Formation of the Triassic Nicola Group. Last year's drill results were released from the York-Viking Zone which confirmed multiple gold horizons over a substantial area and yielded significant intersections such as 12.0 m of 1.41 g/t Au in hole DDH 27100. The bulk of the drilling this year was at the Nordic showing where, historically, gold grades are slightly higher than at the York-Viking but to date the zone has not been well characterized. Trenching and drilling were completed in and around the Bonanza Trench where late 2007 results gave values such as 140 g/t Au across 5.0 m. In 2008, channel sampling over a ten square metre area yielded fifty-five samples that averaged 27 g/t Au (Figure 4.20). The company also reports it has identified the bismuth telluride hedleyite in the Bonanza Trench, a mineral closely associated with

Figure 4.20. Consultant Grant Crooker showing the sawn channel samples in the Bonanza Trench at GoldCliff Resource Corp's Panorama Ridge property near Hedley.

other gold deposits within the Hedley camp.

Target Exploration and Mining drilled nine holes at the **Bradshaw Gold** project located ten kilometres southeast of the Nickel Plate Mine. The property hosts both high-grade veins as well as broader zones of low–grade gold within highly deformed chert of the Ordovician to Triassic Apex Mountain Complex. The best result came from hole BS08-05 which intersected 4.9 m of 1.98 g/t Au whilst there were numerous intersections that ranged from 0.8 - 11.1 m grading 0.95 - 2.33 g/t Au.

OKANAGAN VALLEY – SOUTHERN MONASHEES (KELOWNA – PENTICTON)

Almaden Minerals Ltd continues to evaluate the **Elk** (Siwash North) mesothermal gold-quartz vein project 45 kilometres southeast of Merritt, and just two kilometres south of Highway 97. The company has completed a scoping study and metallurgical work in support of advancing the project through to the resumption of mining and is reporting interest from various parties in the project. Results released from 2007 drilling, such as 3.16 m of 45.2 g/t Au in hole SND07506, reflect the high tenor of gold at the property.

Partners Molycor Gold Corp and Goldrea Resources Corp were active at the **Empress** property west of Summerland and 15 km south of the former Brenda Mine with a drill program that was initiated last fall. The property is west of and contiguous to the better known CrowRea property that was discovered by Goldrea in 1995. Previous work was done on the Empress property by Anaconda Canada Ltd in 1968 who followed up anomalous stream sediment samples with trenching and drilling. Mineralization is found as molybdenite-pyrite-chalcopyrtie disseminations, veinlets and in quartz stringers hosted within porphyritic quartz monzonite rocks of the Middle Jurassic Osprey Lake batholith. Better drilling orientation and molybdenite recoveries owing to diamond drilling rather than percussion drilling have given much improved results such as a very high-grade intersection of 0.180% Mo over 15 m as seen in hole Emp 19. The near surface position of much of the mineralization provides encouragement for the potential of an open pittable resource.

Jasper Mining Corp was very busy at its **Isintok** molybdenum-copper-silver prospect, located southwest of Summerland and completed a thirty eight hole program this year. Previous work by Anaconda Canada Exploration Ltd and Canex Aerial Exploration Ltd delineated an historical near-surface resource of 23 million tonnes of 0.161% Cu and 0.04% Mo. Although explored as a porphyry exploration target, the company reported many high-grade molybdenum intersections that may warrant specific evaluation. Hole IS-08-34 is being touted as the modern discovery hole on the property where 94.67 m grading 0.086% Cu, 0.015% Mo, and 0.77 g/t Ag was intersected. The hole was sited on a coincident induced potential and geochemical target and contained the greatest density of potentially mineralized veins apparent in drilling to date.

Just 1100 m to the north of the former Brenda Mine, Bitterroot Resources Ltd was active on the **North Brenda** property and completed a geochemical and an induced polarization survey in preparation for further drilling. Results were released from late 2007 drilling and some promising long intersections included 297.5 m of 0.058% Cu and 0.019% Mo in hole NB07-11.

Almaden Minerals Ltd has dusted off its **Munro** copper-molybdenum property which it first acquired in 1986 and drilled in 1996 and 1997. Located 20 km south of the Brenda Mine, the property is thought to have genetic similarities to the mine and has yielded some interesting previous results, such as 14.8 m of 0.1% Mo with 15.1 g/t Ag and 0.27% Zn.

SHUSWAP LAKES – COLUMBIA RIVER – NORTHERN MONASHEES (REVELSTOKE)

International Bethlehem Mining Corporation through a wholly owned subsidiary owns the **Goldstream** copper-zinc mine-mill complex north of Revelstoke that lies in the heart of this region which is best known for its stratiform base-metal deposits hosted in cover sequences of the Monashee Complex. With a 1360 dry metric tonnes per day capacity, this custom mineral processing plant is permitted to custom mill off-site ore feed as well. The company continues to evaluate the zinc and copper-bearing tailings at the property for possible re-processing. This year the company planned to complete a new resource estimate of the tonnage of material grading higher than 1.5% zinc. Within the broader region the company holds several properties, known collectively as the Big Bend project, that it has been evaluating as potential feed sources for its mill. This year the company

was most active on the **Cottonbelt** property where it drill tested the hinge zone of the Mount Grace syncline for Broken Hill-type lead and zinc mineralization.

The **J&L** property of Merit Mining Corp is located 45 kilometres north of Revelstoke and was the subject of a large fall 2007 and early 2008 exploration program. At the property the Main and Yellowjacket zones of silver-lead-zinc stratiform mineralization are hosted by highly deformed metasedimentary rocks of the Proterozoic-Paleozoic Hamill Group. In late 2007, a concerted effort was made to establish a permanent camp at the property to allow for a significant underground development and drilling program. Work began on the rehabilitation of the 832 portal, slashing of existing workings and further development of upwards of 538 m of new decline to intercept the 830 workings of the Main Zone. Work was well underway when the company temporarily suspended work in August so that strategic resources could be deployed to the company's Greenwood project. Results from a late 2007 surface drill program were released which confirmed that there were several mineralized horizons within the Yellowjacket Zone with grades similar to those from previously published resource figures.

Nearby on the south flank of Frenchman Cap Dome, Torch River Resources Ltd drilled the **Mount Copeland** high-grade molybdenum skarn project. The property is a past producer that was active briefly as an underground operation between 1970 and 1973. Mineralization consists of disseminated, massive and stockwork-hosted molybdenite within syenite pegmatite and syenite aplite along a boundary of an extensive nepheline syenite body. The syenitic rocks in turn form sill-like bodies within calc-silicate metasedimentary rocks. Prior to going into production the property was reported to contain 163 278 tonnes of resources grading 1.09% Mo. The company's plans included drilling around the 6950 Glacier Zone where most of the previous production occurred in search of extensions to the mineralization.

OUTLOOK FOR 2009

The varied geology of the south-central region hosts many favorable environments for exploration including porphyry, high-grade vein and stratiform deposits. The area has been fortunate to have numerous highly motivated junior companies with sizeable budgets to evaluate some of the high quality deposits in the region. The late 2008 economic crisis, which appears to have caught most forecasters by surprise, makes it difficult to forecast mineral exploration activity in this region for 2009. There appeared to be fewer new financings over the course of the year which seems to suggest that exploration treasuries for many companies might be diminishing.

For the Highland Valley mine, the operation will continue balancing volatile commodity prices, foreign exchange rates, energy costs, ore-grade control and other corporate commitments to maintain its profitability. The New Afton mine development will continue at reduced rates and hopefully there will be some reduction in capital construction costs with a slow down in the construction industry. All projects that have completed feasibility studies and stated resources will have to recheck their assumptions to ensure they move their projects ahead in prudent fashion.

Junior companies will be challenged with smaller budgets and those with cash resources might find many worthwhile projects available for acquisition. Prospectors with sharp eyes might again find new opportunities on opened ground from expiring tenures, in contrast to the last few years, where tenure acquisition was at record levels (Figure 4.21).

Figure 4.21. Edgar Mosley showing the hard work prospectors put into their claims at his Spar property near Tulameen.

ACKNOWLEDGMENTS

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SOUTHWEST REGION

By Bruce Northcote, PGeo
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SUMMARY AND TRENDS

Following the mining and exploration industries' strong performances in 2007 across the province, 2008 began with generally high expectations in the southwest for both commodity prices and exploration activity. Overall, 2008 spending on exploration remained strong in the southwest, relative to previous years. Rapidly changing conditions from late summer through the fall began to affect producers and explorers in the same way as virtually everywhere else. Companies with cash in their treasuries became increasingly selective and cautious, those without became reluctant or unable to undertake financing. In any year a number of proposed projects do not materialize or are cut short for various reasons. Anecdotally, financial reasons were cited more frequently in news releases and conversation in 2008 whereas in the previous year, equipment and personnel shortages, permitting or technical difficulties were frequently cited. Flow through tax incentives continued to be an important stimulus. Despite the economic uncertainty in the latter part of the year, several large projects did continue into November and December.

With zinc prices leading base metals later in 2008, an unfortunate result was the announcement in October that production at Breakwater Resources **Myra Falls Operations** would be suspended later in the year.

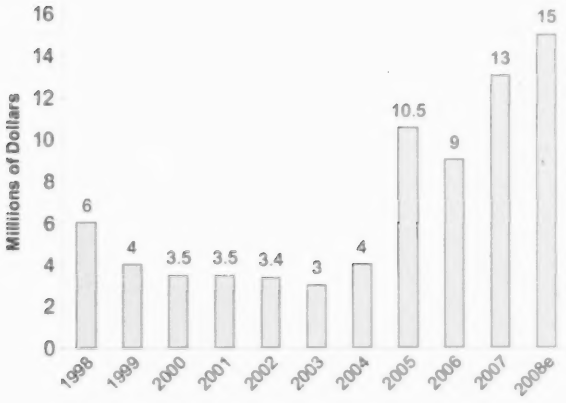

Figure 5.1. Annual Exploration spending in millions of dollars, Southwest Region.

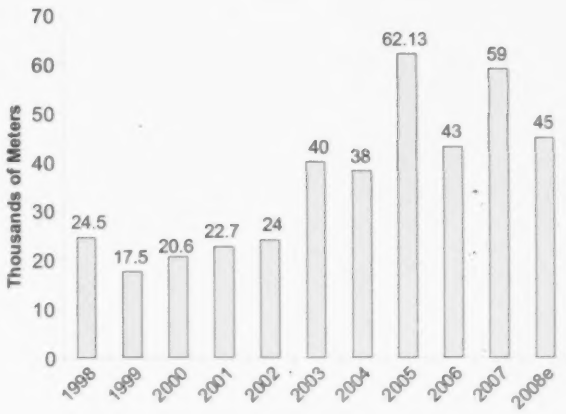

Figure 5.2. Annual exploration drilling in thousands of metres, Southwest Region.

Myra Falls has made significant gains in efficiency over the year and remains in operation at the time of writing.

Production at **Quinsam** thermal coal mine is on track to end at a similar level to the previous year. Employment at the mine is up over last year. With positive exploration results over the past several years, and continuing significant development work, an expansion of this operation remains likely.

Mine development spending is estimated at $9 million for 2008, mainly at Myra Falls and Quinsam coal.

Production at the major quarries remained at high levels in 2008. Softening demand in the latter part of the year began to affect some producers. Contrary to this trend, Electra Gold Ltd anticipates approximately doubling its sales of chalky geyserite from **Apple Bay** in 2009 if an expected contract is finalized. Prices for aggregate and industrial minerals are negotiated either by shipment or contract basis; they may vary but are not necessarily subject to the same price fluctuations seen for metals.

Figure 5.3 Mines, quarries and major exploration projects of South West British Columbia 2008

Figure 5.3. Mines, quarries and major exploration projects, Southwest Region, 2008.

Similar to the rest of the province, the top exploration projects in the Southwest Region in terms of spending this year include the porphyry prospects **Hushamu**, **Catface**, **Okeover**, **Crack** and **Honeybun**. Iron skarns on Vancouver Island received a new level of interest in 2008. Two magnetite projects on the west coast of Vancouver Island were among the largest exploration efforts in the region this year: the **Pearson** project near Port Renfrew and the **Brynnor** near Ucluelet. **Myra Falls** completed a significant exploration program in 2008. One gold project, **Mineral Creek**, completed a major drill program, continued processing a bulk sample and discovered a new high grade vein. There were significant infill drilling programs on resources surrounding the **Quinsam** coal mine. The **Raven** coal project was the subject of a new joint venture with international partners and a consolidation of the land position, which should allow further exploration work to proceed. Exploration programs for aggregates and industrial minerals also occurred in the region in 2008.

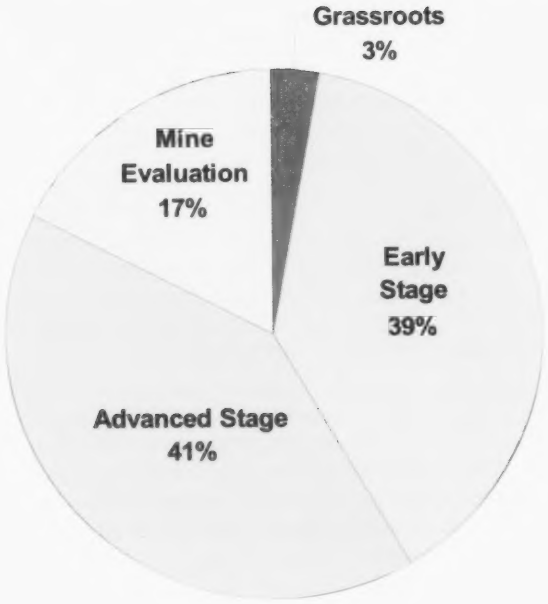

Figure 5.4. Estimated exploration spending by category, Southwest Region, 2008.

OPERATING MINES AND QUARRIES

Metals

News at **Myra Falls** over the course of 2008 included a revision of the production plan, a significant round of layoffs and a new labour contract with its hourly employees. The year was a difficult one for zinc producers, and Breakwater Resources Ltd, operator of Myra Falls, faced the same challenges as others. The mine instituted measures aimed at improving its financial performance; however, zinc prices continued to decline over the course of the year. As the price fell below 50 cents per pound in late October, Breakwater announced a planned suspension of operations at Myra Falls, along with its new Langlois mine in Quebec. These mines joined a number of other zinc operations worldwide which have reduced or temporarily stopped production in response to deteriorating market conditions in the second half of 2008. Breakwater Resources Ltd monitored the markets and its operations carefully and was able to keep the Myra Falls mine open throughout the year.

At December 31, 2007, Myra Falls had 5 835 000 tonnes of proven and probable reserves at 5.3% Zn, 0.05% Pb, 1.0% Cu, 45 g/t Ag and 1.3 g/t Au. Base metal prices used to determine economic viability for this estimate were significantly higher than prices at the time the decision was made to suspend production. At the time of the estimate, this would have suggested a mine life of 8 years based on an 800 000 tonne-per-year mine plan. Measured and indicated resources (including the reserves) were over 6.3 million tonnes at somewhat higher grades. A further 3.8 million tonnes are estimated in the inferred category. Toward the end of 2007 and into 2008 exploration efforts began showing encouraging results.

Development work at the Lynx and Price orebodies to allow exploration work and potentially mine development was suspended in favour of higher grade targets nearer existing infrastructure. A large portion of the 2008 capital expenditures at Myra Falls went toward construction of a new tailings disposal area.

Coal

In the nine month period ended September 30, Hillsborough Resources Limited's **Quinsam** thermal coal mine produced 335 098 tonnes of clean coal from 555 658 tonnes raw coal. Forecast production for 2008 was approximately 500 000 tonnes of clean coal. As in the previous year, delays related to training of personnel, faulted ground and equipment breakdowns impeded a planned increase in production at the underground room and pillar operation. Total in-situ reserves (proven and probable) are estimated at 23.1 million tonnes as of December 31, 2007. The majority of the mine's shipments travel from the site by truck to Campbell River and then by barge from the Middlepoint loading facility to customers in the Lower Mainland and Pacific Northwest. Local Vancouver Island customers are served by truck and international shipments can be taken to nearby deep water port facilities, such as that of Texada Quarrying Ltd on Texada Island.

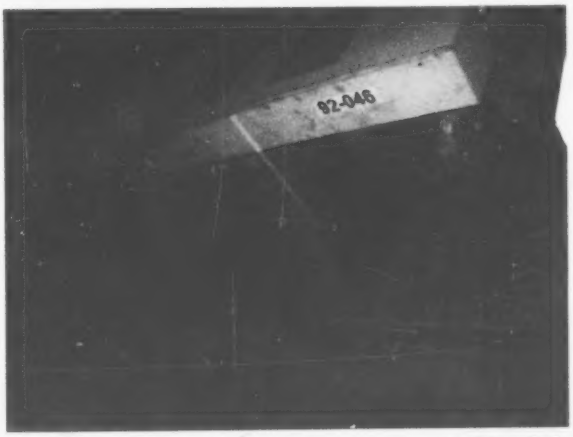

Figure 5.5. Flotation tanks at Breakwater Resource's Myra Falls Operations.

Coal inventories at Quinsam in 2008 were higher than 2007, in part to fulfill an international shipment in the final quarter of the year, part of a larger off-take agreement with Vitol SA. Quinsam has locked in 2009 and 2010 international contract prices, offering some protection from recent price decreases for coal. Additionally the mine supplies five cement manufacturers in the Lower Mainland and Pacific Northwest.

Development at Quinsam proceeded with an underground access route, new equipment and an upgrade to the coal processing plant. Drilling at Quinsam North continued to define the resource there, and to provide geotechnical data for a mine development plan. The measured and indicated resource at Quinsam North is currently 21 million tonnes with 13 million tonnes being considered for a mining plan by the company. At the Quinsam 7 South area, there was infill drilling, including core drilling, to verify coal quality and facilitate developing an underground mine plan. The resource there is estimated at more than 3.8 million in-situ tonnes.

INDUSTRIAL MINERALS AND AGGREGATES

Limestone

Texada Island hosts three major limestone quarries producing aggregate, cement grade, agricultural and chemical grade limestone and dolostone products. The largest quarry is that of Texada Quarrying Ltd, a subsidiary of the large building materials company Lafarge North America Inc. Aggregates and Roadbuilding Magazine has identified this operation near **Gillies Bay** as Canada's largest quarry for several years, including 2007, when more than 7 million tonnes were shipped.

Figure 5.6. A truck from Quinsam releases its load of coal at Hillsborough Resources' Middlepoint barge loading facility.

As a rough estimate, Texada Quarrying's operation near **Gillies Bay** will ship 6 million tonnes in 2008, with 4.5 million tonnes of limestone to five plants in the Lower Mainland and some Seattle area cement plants. They also sold 0.5 million tonnes of chemical grade carbonate products to other plants and approximately 1 million tonnes of aggregate, including igneous dike material. The latter is shipped principally to the Lower Mainland market, including the Deltaport expansion project. Approximately 100 000 tonnes of asphalt aggregate went to Hawaii in 2008 as in 2007. Two years ago the quarry upgraded its ship loading facility, which is capable of accommodating Panamax class freighters.

Imperial Limestone Company Ltd forecasts 2008 production of 280 000 tonnes at its Quarry near **Van Anda** on Texada Island. This represents an increase over 2007. The product is shipped to parent company J.A. Jack & Sons Inc of Seattle, where it is processed and sold for chemical uses, agricultural lime, glassmaking, plaster and other industrial uses.

The **Blubber Bay Quarry** is owned by Ash Grove Cement Company. Recently the majority of the product has gone to the Lower Mainland market for use as aggregate. To the end of October the quarry had produced approximately 600 000 tonnes and shipped approximately 473 600 tonnes with a workforce of 16. Roughly 32 700 tonnes of dolostone is shipped to Ashgrove's Rivergate cement plant in Portland Oregon. As a rough estimate, Blubber Bay expects to produce another 10 000 tonnes by the end of the year before a temporary shutdown.

Imasco Minerals Inc operates a quarry at **Benson Lake**, northern Vancouver Island, producing a white crushed marble product. Production for 2008 is reported at 38 400 tonnes with shipments of approximately 40 800 tonnes. The high brightness material is barged from Port Alice to Imasco's Surrey facility and marketed as finely ground $CaCO_3$ (typically 95% purity) for fillers and extenders with a variety of industrial uses.

Aggregate

A brief survey of the largest producers in the Southwest Region demonstrated the continuing health of the industry into 2008. There were signs of a local drop-off in demand in late 2008 as local new housing starts decreased; however, local infrastructure development continues. Capability for water transport is the common feature of most of the largest operations. The Gillies Bay quarry, large operations at Sechelt and Port McNeill have facilities for loading Panamax class bulk freighters. Aggregate producers are often not prepared to release production forecasts, and pricing information.

Operated by Construction Aggregates Ltd, a subsidiary of Lehigh Cement Company, **Sechelt Pit** processed 5.7 and sold 5.1 million tonnes in 2007 and had anticipated an increase for 2008 to in part replace production at the now-closed **Producer's Pit** in Metchosin. An equipment failure early in the year slowed production from approximately February to June. Later in the year production was intentionally held back as inventories began to build up. A rough projection for 2008 is 5 million tonnes extracted and 4.5 million tonnes sold. Sechelt's principal market remains the Lower Mainland, with an estimated 20-25% of the product going to California and lesser amounts to Victoria and the Gulf Islands.

Polaris Minerals Corporations's **Orca** quarry near Port McNeill had a strong quarter in the three months ending September 30 with sales of 694 000 tons (630 000 tonnes). The company anticipates a yearly total of 2.1-2.5 million tons (1.9-2.3 million tonnes) shipped by the end of 2008. This is up from 1.15 million tons (1.04 million tonnes) in 2007. While aggregate prices generally have been under pressure following the decline of the US housing market, Polaris reports that prices received in its contracts are holding firm, even increasing slightly. Shipping fuel surcharges were affecting margins significantly. Under the terms of its contracts, it can recover these fuel costs in the year following the year in which they were incurred, *i.e.* 2009 sales prices will incorporate this recovery. At present, the 2009 contracts suggest 2009 volumes similar to those of 2008. Orca currently ships to markets in the San Francisco Bay area, Hawaii, and Vancouver. Like Sechelt, Orca products are of high quality and compete well on that basis. Infrastructure spending, particularly in California in the coming years will be important to Sechelt and Orca's export opportunities

The **Cox Station** quarry of Mainland Sand and Gravel Ltd produces crushed aggregate from quartz diorite on the north side of Sumas Mountain. Production in 2007 was approximately 2.5 million tonnes, following some equipment upgrades. Management estimates the quarry will ship approximately 2.7 million tonnes in 2008. Virtually all goes to local markets and most is shipped by barge on the Fraser River. At the time of writing, demand had remained steady.

Lafarge North America operates a large natural sand and gravel quarry at the mouth of Skookumchuk Narrows at **Earle Creek**. In operation since 1971, it is now capable of producing a maximum of 2.5 million tonnes per year. Recently it has produced 1.35 to 1.5 million tonnes per year. All material is shipped by barge to the Greater Vancouver market where 75% goes to value added applications such as ready mix, asphalt and block fabrication. On the **Pitt River** in Pitt Meadows, Lafarge's crushed aggregate plant produces 1.3 to 1.5 million tonnes per year. Approximately 50% of the product is shipped by barge and 50% by truck. It is used for asphalt and base construction. The new Golden Ears bridge from Langley to Maple Ridge is expected to rely on aggregate from this and possibly other quarries.

The combined 2008 production of three sand and gravel quarries on **Pipeline Road** in Coquitlam is expected to exceed 2 million tonnes in 2008. These operations belong to Jack Cewe Ltd, Allard Contractors Ltd and Coquitlam Sand & Gravel. Valley Gravel Sales Ltd in Aldergrove has recently been another of the southwest region's more than 1 million tonne per year producers. Smaller pits in the region number in the hundreds.

Silica and Alumina

Sumas Shale Ltd continued with production at its **Sumas Mountain** quarry at virtually the same levels as previous years, with the large majority (98%) of its product consisting of shale, used in the Lower Mainland's cement industry. The remaining 2-3% is used in the brick industry. Companies under the Clayburn Industrial Group umbrella also manufacture and market products made from Sumas Mountain fireclay, used in refractory brick products.

Electra Gold Ltd's **PEM 100** quarry at **Apple Bay** has been supplying Ash Grove Cement Company in Seattle with chalky geyserite since 2003. Projected total shipments from the quarry this year are approximately 100 000 tonnes. Electra has also begun filling orders for Lafarge North America and is negotiating a longer term contract that would see production at the quarry approximately double in 2009. The chalky geyserite is an intensely silicified and clay altered rhyolite useful to cement makers as a source of silica and alumina. Early in the year, Electra completed a new access road to facilitate exploration and development of another geyserite resource on Holberg Inlet.

Lehigh Northwest Cement Limited's **Monteith Bay** quarry also produces a high silica geyserite used in the manufacture of cement. This quarry remained on care and maintenance in 2008.

Other Rock and Mineral Products

Great Pacific Pumice Inc's **Mount Meager** operation was placed on care and maintenance following an accident in 2007. Current management reports shipments on a small scale in 2008 and plans a return to full production in the coming year. The quarry is inaccessible during the winter and spring months, typically opening in May or June. Garibaldi Aggregates Ltd has also been producing pumice under bulk sample permits in the Mount Meager area as it progresses toward obtaining a mining lease. Pumice has a number of industrial and engineering applications, but most finds use as lightweight fill.

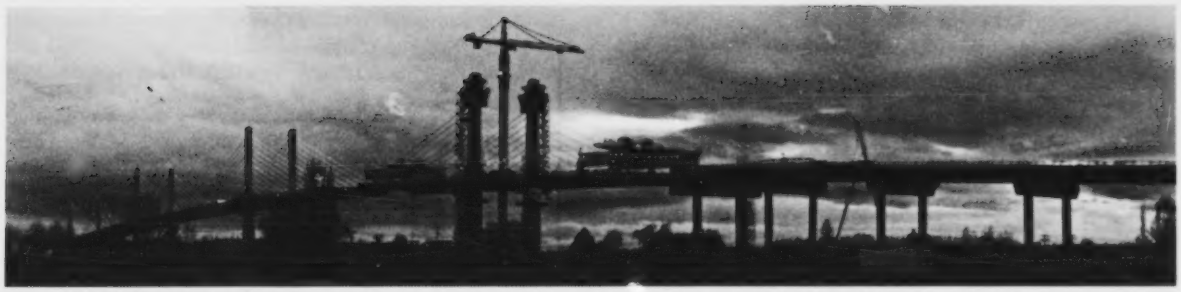

Figure 5.7. Golden Ears Bridge construction, Lower Mainland, as of early December 2008. In addition to fill, infrastructure projects such as this typically require high quality aggregate and other construction materials that can meet specific engineering standards.

There are a number of quarries in the region producing decorative rock for landscaping, flagstones, facing and dimension stone. Marble is quarried at several locations on Vancouver Island by Matrix Marble & Stone, based near Duncan, who also make a variety of value-added prôducts. K2 Stone Inc has a **slate quarry** near Port Renfrew. At their facility at Duke Point near Nanaimo, the stone is split and cut to create building and landscaping products. Recently there have been other slate producers near Port Renfrew producing intermittently. The Squamish-Whistler corridor has several active quarries and intermittently active quarries. Huckleberry Stone Supply Ltd has been producing landscaping stone and facing for a number of years at its **Spumoni** quarry and other nearby locations. Corridor Masonry is another supplier of Quaternary Garibaldi volcanic rock. Granite is also quarried periodically in the Sea to Sky region. In recent years, historic quarries at **Hardy Island** (Hardy Island Granite Quarries Ltd) and **Haddington Island** (Haddington Island Stoneworks Ltd) have been shipping several thousand and several hundred tonnes respectively. Much of the product is processed at Bedrock Granite Sales Ltd in Coquitlam.

Sources of glacial marine clay for cosmetic purposes are best known near Bella Coola although other potential sources have been investigated. Glacial Marine Clays Inc (formerly Carrie Cove Cosmetics Inc), Precision laboratories Ltd and Ironwood Clay Company are among the companies that own the local quarries and market this material.

MINE DEVELOPMENT PROJECTS

(PROJECTS IN THE ENVIRONMENTAL ASSESSMENT PROCESS)

The **Cogburn** magnesium project entered the Environmental Assessment Office (EAO) pre-application with a project description report in 2005, following a 2003 feasibility study for Leader Mining International Inc. In 2007 the proponent communicated its decision to suspend its environmental assessment work pending more favourable economics. Among other factors, the project would be sensitive to magnesium metal and energy prices. The deposit is a body of olivine-rich peridotite (dunite) with uniformly high magnesium content, located close to power and transportation infrastructure.

The **Hillsbar** aggregate project entered the EAO pre-application phase in 2003 with a project description submitted on behalf of Qualark Resources Inc, a corporation formed to represent Yale First Nation and other private interests. A new exploration-stage project at Hillsbar is operated by Yale First Nation and Lehigh Northwest Cement Company. The Yale First Nation has an investigative permit for sand and gravel.

Pan Pacific Aggregates Ltd started the environmental assessment pre-application process with its **Sechelt Carbonate** project in 2005. Pan Pacific continued to advance the project until 2007 with significant exploration programs totalling several millions of dollars. The principal targets are chemical and cement grade limestone and dolostone deposits. The company cited delays in submitting a large producer permit for the northern Sechelt Peninsula and in 2008 Pan Pacific's focus shifted to a new acquisition, the **Pumptown Quarry** in the Fraser Valley. Near-term plans as of the end of September 2008 were to develop their Fraser Valley aggregates business and utilize an existing small producer permit on the Sechelt Peninsula. Negotiations with Columbia National Investments Ltd to acquire an aggregate operation at Pine Flats (next to Construction Aggregates Sechelt Pit) were not concluded by year end. Pan Pacific retains a large tenure holding on the Sechelt Peninsula.

Eagle Rock, a permitted crushed rock quarry on Alberni Inlet, has remained undeveloped as Polaris Minerals Corporation focuses its efforts on the Orca quarry and securing sales contracts and access to port facilities in its primary target market. AMEC, a company under contract to Polaris, has resumed a feasibility study of Eagle Rock for Polaris and the company has renewed its BC Environmental Assessment certificate, which would have expired in September 2008. The prospective product at Eagle Rock would be mined from a uniform, unfoliated, medium grained slightly porphyritic granodiorite phase of the early Jurassic Corrigan Pluton.

TABLE 5.1. PRODUCING MINES AND QUARRIES, SOUTHWEST REGION, 2008.

Mine	Operator	Commodities	Mine Workforce	Forecast Production 2008	Reserves as of Dec 31, 2007
Metals					
Myra Falls Operations	NVI Mining Ltd (Breakwater Resources Ltd)	Zn-Cu-Au-Ag	287	34 200/29 000 t Zn 4900/4700 t Cu 485/361 kg Au 21 700/12 900 kg Ag (Metal in concentrate, contained/payable)	5 835 000 t 5.4% Zn 0.5% Pb 1.0% Cu 1.3 g/t Au 45 g/t Ag
Coal					
Quinsam	Quinsam Coal Corp (Hillsborough Resources Ltd)	Thermal coal	150	500 000 t clean coal	23.090 million t (proven and probable in situ reserves)
Industrial Minerals					
Apple Bay (PEM 100)	Electra Gold Ltd	Chalky geyserite	8	100 000 t	~5 million t
Benson Lake	Imasco Minerals Inc	White marble	5	38 400 t	100+ years
Blubber Bay	Ash Grove Cement Corp	Limestone aggregate, dolomitic limestone	16	610 000 t	100+ years
Gillies Bay	Texada Quarrying Ltd Lafarge North America Inc)	Limestone, aggregate	104	6 million t	100+ years
Van Anda	Imperial Limestone Company Ltd (JA Jack & Sons Inc)	Limestone	11	280 000 t	~50 years
Monteith Bay	Lehigh Northwest Cement Limited	Geyserite	Care and maintenance 2008		
Mount Meager	Great Pacific Pumice Ltd	Pumice	Care and maintenance 2008 (minor shipments)		100+ years
Sumas Mountain	Sumas Shale Ltd Clayburn Industrial Group and cement manufacturer (partners)	Shale and clay	10-20	510 000 t	~70 years

EXPLORATION HIGHLIGHTS

Northern Vancouver Island

IMA Exploration Inc optioned the **Hushamu** property in 2008 and was carrying out their initial phase of drilling late in the year in the **NW Expo** area, the site of 2005 and 2007 intersections of porphyry style molybdenum and gold mineralization. The majority of 2008 work occurred on the NW Expo. The company also began infill drilling on the Hushamu deposit itself. The company hopes to upgrade the inferred resource and collect data on molybdenum grades, not currently included in the resource estimate.

There are several known mineral occurrences within the area covered by the Hushamu property in what is commonly referred to as the Island Copper trend. Known porphyry copper-molybdenum-gold prospects are associated with Early to mid-Jurassic Island Plutonic Suite (diorite, quartz diorite, quartz monzonite and granodiorite) and Lower to Mid Jurassic volcanics of the Bonanza Group north of the WNW trending Holberg Fault and south of the WNW trending contact with Vancouver Group rocks. A string of lead-zinc (±silver) skarn occurrences follows this northern contact, several of which have been the subject of work in recent years.

Sand and gravel producer Polaris Minerals Corporation conducted exploration on its Northern Vancouver Island properties in 2008, which include the **Bear Creek**, **West Cluxewe** and **Cougar** properties.

Electra Gold Ltd acquired the right to obtain coal licences covering the **Suquash** coal field near Port Hardy. There was an initial exploration program in 2008.

Figure 5.8. A drill rig at the foot of Hushamu Mountain, on IMA Exploration's Island Copper project.

Following more intensive activity in 2006 and 2007, the **Merry Widow** property of Grande Portage Resources Ltd was relatively quiet in 2008. They have initiated a program of monthly baseline environmental sampling in the drainage area surrounding the Merry Widow Pit.

Western Gateway Minerals Inc conducted a 1000 m drill program on the **Copper Tree** property near Menzies Bay early in 2008. Copper mineralization has been described as redbed copper and vanadium, occurring largely as chalcocite and native copper in interflow sediments and/or tuffs near the top of the Karmutsen Formation. Copper is also found in amygdules within the flows themselves, but these occurrences have so far proved lower grade. Deposits in the Menzies Bay area have seen small scale historic production, despite the elusive, flat-lying and apparently spotty nature of mineralization.

Near Tahsis, Homegold Resources carried out a small drill program at its **Glengarry/Rob Roy** property. These showings are recorded in MINFILE (092E 001, 092E 015) as iron skarns, but there is also potential for gold mineralization.

Mid Island

Exploration efforts at **Myra Falls** changed focus over the course of the year. Drilling the Marshall Zone from the surface proved difficult, but has produced at least two impressive intersections. Hole MR15-0014 intersected 6.6 m (true width) of 12.8% Zn, 0.8% Cu, 109 g/t Ag, 2.7 g/t Au and 1.1% Pb. Hole MR15-0015 confirmed that the zone extends west into an untested area, with a 7.5 m intersection of 6.47% Zn, 0.46% Cu, 0.36% Pb, 1.1 g/t Au, 83.6 g/t Ag. Given that targets are more than 800 m below surface, the company has decided that future drill testing of the Marshall Zone will require a new drift. The inferred resource at the Marshall is 2.0 million tonnes at 8.8% zinc. As the need to cut exploration expenses became apparent, exploration drilling in the latter part of the year moved closer to existing mine infrastructure. Underground drilling focused on the peripheries of the Bornite and Gnu lenses, west of the Gopher lens and on an east extension of the HW Main zone. This relatively inexpensive closer-range exploration has been successful in locating extensions of the Bornite and Gnu mineralization and also a possible western down-drop of Gopher mineralization and host stratigraphy.

As noted above, Hillsborough Resources Ltd carried out definition drilling at **Quinsam North** and **7-South**. The combined programs consisted of approximately 3500 m of rotary and core drilling to define and upgrade the resources and for geotechnical and environmental testing. The company hopes to obtain necessary permits, proceed with feasibility studies and develop mine plans for underground and a potential open cast operation. They expect to significantly expand and extend coal mining operations at Quinsam in future.

A further indicator of the potential of coal to once again enhance the Vancouver Island local economy. The **Raven** coal project of Compliance Energy Corporation was quiet on the ground in 2008. Compliance and its partners, Itochu Corporation and LG International Corp, reached an agreement to purchase from West Fraser Mills Ltd certain freehold coal, mineral and gas rights, consolidating the joint venture's Comox Basin holdings. The Korean partner also agreed to provide the funding necessary to reach a production decision on the Raven coal project. The Raven deposit's measured and indicated resources stand at 39 million tonnes with a further 59 million tonnes in the inferred category. The coal is classified as High Volatile A Bituminous. A preliminary economic assessment considered production of both thermal and metallurgical coal.

A joint venture between Bitterroot Resources and Mineral Creek Ventures Inc proceeded with a significant drill program and processing of a bulk sample at the **Mineral Creek** project. As of August, more than six hundred grams of gold had been produced from 4.8 tonnes of ore mined from the Lower Linda vein. Based on these results, the partners have purchased new crushing equipment and are ordering a mill which is expected to allow much higher throughput. The project has a permit to process a bulk sample of up to 5000 tonnes. In August 2008, a new quartz vein, the Ember vein, was discovered approximately 120 m south of the Lower Linda. True width at the discovery outcrop is approximately 0.5 m. Chip samples returned results of 29.9, 41.6 and 69.7 g/t Au. Early drill results are impressive, with 253.6 g/t Au over an estimated true with of 1.5 m (Hole BTT-L54 from 64.3 to 68.8 m).

The **Catface** copper deposit saw a major exploration project for the first time in nearly 20 years in 2008. Selkirk Metals Corp drilled approximately 2400 m in eight NQ holes during a two month helicopter-supported program. The mineralized zones at Catface are called the Cliff, Irishman Creek and Hecate Bay zones. Most of the work and all of the drilling in 2008 and historically has focused on the Cliff zone. Drilling was intended to confirm historical copper results. Assays available at time of writing have done so, and in addition indicated significant and consistent silver values. Further work would be required to upgrade historical resource estimates to NI 43-101 standards. The Cliff zone has a 1990 drill indicated resource estimate by SRK Consulting of 170 million tonnes at 0.43% Cu using a 0.30% cutoff (or 390 million tonnes at 0.31% Cu using a 0.15% cutoff).

Mineralization at Catface is largely fracture controlled and hosted by several lithologies, including Westcoast Crystalline Complex diorite, a probable Island Intrusive Suite member and Karmutsen (possibly Sicker) volcanic rocks. Mineralization appears genetically related to mid-Eocene porphyritic quartz diorite to granodiorite stock or cupola, part of the Tofino Intrusive Suite.

East of Ucluelet near Kennedy Lake, Logan Resources published an initial resource estimate and

Figure 5.9. A helicopter-portable drill rig on the Cliff zone at Catface Copper.

Figure 5.10. Drilling underground at Myra Falls. Exploration focused on targets close to existing mine infrastructure in the latter half of 2008.

preliminary economic assessment for the **Brynnor** iron deposit. It is located on the company's Redford property, most recently explored for its gold potential. The NI 43-101 compliant estimate of 7 070 000 tonnes of a measured and indicated resource grading 51.3% Fe is based on historical data. A further 18 620 000 tonnes are in the inferred category. Brynnor is a magnetite skarn at the site of a Noranda mining operation in the 1960s. Following discovery in 1960, magnetite was concentrated and shipped from nearby loading facilities in Toquart Inlet to customers in Japan from 1962-1968. The contract was for 635 000 tonnes per year for a period of seven years. High iron ore prices in 2007 and the early part of 2008 prompted a re-evaluation of the economics of an operation on a similar scale.

In addition to the resource estimate, Logan carried out reconnaissance prospecting and soil sampling on the Redford property and conducted a significant drill program at the end of 2008 with the objective of upgrading and extending resources.

Magnetite at Brynnor occurs within a sequence of limestone and tuff of the Upper Triassic Quatsino Formation. Diorite and granodiorite of the Island Plutonic Suite are in intrusive contact with the limestone and tuff, which are also intruded by Tertiary diorite to syenite dikes.

South Island

Pacific Iron Ore Corporation is a new public company also focusing on magnetite iron ore exploration on southwest Vancouver Island. Pacific Iron Ore has substantial land holdings along the west coast of Vancouver Island. The principal targets at the **Pearson** project are iron skarns located north of the San Juan Fault in an area underlain by largely by diorites of the Westcoast Crystalline Complex and quartz diorite to granodiorite of the Island Intrusive Suite. Magnetite skarns are associated with gabbro-diorite intrusives and carbonates thought to belong to the Vancouver Group. There are historical resource estimates calculated for individual deposits on the property, however significant new drilling (53 core holes) was completed in 2008 and an extensive airborne geophysical survey begun.

Nitinat Minerals Corporation conducted an airborne geophysical survey over the **Jasper** property in February. Grassroots exploration work in recent years has identified a number of sulphide occurrences in addition to the four documented MINFILE occurrences on the property (092C 037, 80, 81, 88). In addition, the airborne survey identified 22 EM anomalies which did not coincide with known sulphide occurrences. The property is reported to have been drilled in the 1970s and 80s (packsack drilling) but no record of this work has been made public. Government regional mapping shows the area is underlain mainly by Lower Jurassic Bonanza Group volcanic rocks and Island Plutonic Suite granodioritic rocks. Possible Tertiary felsite dikes are also reported.

Mill Bay Ventures Inc assembled lands covering the **Valentine Mountain** gold prospect (MINFILE 092B 108) and the BPEX or Braiteach zone (MINFILE 092B 075) along with other vein occurrences not recorded in MINFILE. The company initiated work with a reconnaissance program of prospecting, geological mapping and sampling. The Valentine Mountain gold project is underlain by greenschist to amphibolite grade metamorphic rocks of the Pacific Rim Terrane, mainly Leech River Complex metavolcanics and metasediments. These are intruded by Tertiary quartz diorite of the Mount Washington Plutonic Suite and Late Cretaceous Jordan River metagranodiorite. A major thrust fault, the sinistral-

Figure 5.11. Garry Payie atop a creek exposure of massive magnetite at Pacific Iron Ore's Pearson project.

Figure 5.12. Plant fossil below a coal seam near the Quinsam mine. The finger belongs to consultant Gwyneth Cathyl-Bickford.

oblique Leech River Fault, lies immediately to the south and divides the Pacific Rim and Crescent Terranes. Native gold is found in quartz veins which postdate milky white metamorphic veins.

Active placer camps remain along the Leech and Jordan rivers after more than 150 years of production.

Inside Coast

Work began late in 2008 at J&S Kulta Mining Inc's **Bute Inlet** property with preparation of drill pads. The target is a possible copper gold skarn. The property hosts a known black sand placer magnetite occurrence. Exploration is expected to resume in the spring.

Sunshine Coast

Prophecy Resource Corporation acquired an option to earn an interest in Eastfield Resources Ltd's **Okeover** property in 2006. This copper-molybdenum prospect, located 20 km north of Powell River on Okeover Inlet, has been explored intermittently since the 1965 discovery of mineralization in creek beds. A 2006 resource estimate has an inferred 86.8 million tonnes at 0.31% Cu and 0.014% MoS_2 at a 0.2% Cu cutoff.

Prophecy's 2008 program consisted of six diamond-drill holes totalling 1449 m. Five holes were step-outs to the south and west of the North Lake zone. The remaining hole was drilled three km to the south.

Diamond drilling programs in 2007 and 2008 were successful in extending North Lake zone mineralization. A 300 m step out to the east encountered mineralization in 2007 and Hole OK-08-03, a 90 m step out to the south in 2008, encountered 45.5 m grading 0.33% Cu and 0.003% Mo. The results suggest the existing inferred resource could be expanded considerably.

The Okeover, or OK property is a calc-alkalic porphyry copper-molybdenum occurrence which is somewhat unusual in that it is situated within the Coast Plutonic Complex (Jurassic-Cretaceous diorite to granodiorite). Like several other porphyry occurrences in the CPC (see Crack Mo and Honeybun, below) mineralization is associated with younger (typically Tertiary) intrusions. In the case of Okeover, these younger intrusives are identified as the OK intrusive complex (quartz diorite, possible granodiorite), and remain undated, though presumed to be Tertiary in age. At least eight showings are distributed in a roughly NNW orientation over approximately five to six kilometres. Of these, the North Lake zone is the only one for which there is a resource estimate.

Sea-to-Sky Region

Wolverine Minerals Corp carried out a program of mapping and diamond drilling on its **Gold King** property (MINFILE 092JNE054) northwest of Pemberton. The property hosts a number of skarn and polymetallic vein prospects and occurrences, mainly in rocks mapped as Cadwallader Group volcanics and lesser sedimentary rocks. Six holes totalling just over 1000 m tested IP chargeability anomalies. All drillholes intersected skarn-related pyrrhotite zones, within which there were some intervals with elevated gold values. Other smaller grassroots stage gold exploration projects occurred in the area north of Pemberton. Also in the sea to sky region, mainly along the Squamish-Whistler corridor, there were several small new projects to quarry aggregate, granite and Quaternary volcanics.

Harrison Lake – Northern Cascades

Wallbridge Mining optioned a large property north of Harrison Lake covering a 2007 discovery by bulldozer operator and prospector Gary Poirier of porphyry style alteration and mineralization. The company reports a number of highly anomalous copper gold and molybdenum values in early grab samples. Encouraged by initial results, the program in summer-fall 2008 consisted of approximately 1400 line km of airborne magnetometer and VLF-EM surveying with prospecting, mapping, and silt, soil and rock sampling on the **Roger's Creek** property.

Regional mapping shows the area underlain largely by Miocene miarolitic granodiorite and syenodiorite with Miocene volcanics and minor sediments. Roger's Creek roughly coincides with an area of anomalous copper in rock samples, a steep magnetic gradient (low to the southeast, high to the northwest) and, on some regional maps, a contact between the Miocene intrusive and Late Cretaceous quartz diorite.

The Roger's Creek area has seen limited grass roots exploration in the past by Placer Development Limited and Noranda Exploration Company Limited in the 1980s. Work was not in precisely the same area as the new targets. Geochemical anomalies were recognized, but follow up never progressed beyond preliminary work. MINFILE occurrences are known to the east (092JSE021) and to the southwest near the Lillooet River (092GNE010, 13, 19, 26, 31, 40). Most of these are placer gold showings.

Westminster Resources Ltd drilled the **Honeybun** molybdenum porphyry prospect in 2008. Results of the approximately 1200 m helicopter-supported diamond drilling program were not yet available at the time of writing. Honeybun is one of a number of molybdenum occurrences in the northern Cascades, several of which saw activity in 2008.

Ten kilometres to the south, Pacific Cascades Minerals Inc conducted IP and diamond drilling on the **Crack** molybdenum project in 2008 with 6.8 line km extending the previous survey to the west. They completed three core holes, totalling 1325 m. No significant intersections were reported following the 2008 program. Future work would return to the area of more promising intersections encountered in 2007.

The **Gem**, located a further 12 km to the southeast has a small historic resource. In 1968, Utah Construction and Mining Company estimated reserves at just under 16 million tonnes grading 0.125% MoS_2 at a 0.10% cutoff. This appears to be the only published molybdenum resource among the showings in the area.

TABLE 5.2 SIGNIFICANT EXPLORATION PROJECTS, SOUTHWEST REGION, 2008.

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program	Metres Drilled
Bear Creek	Polaris Minerals Corporation	092L 055	Aggregate	sedimentary	PD, GP	n/a
Brynnor	Logan Resources Ltd	092F 001	Fe (magnetite)	Fe skarn	GC, DD	6200
Catface	Selkirk Metals Corp	092F 120	Cu, Ag	porphyry Cu	DD	2400
Crack	Pacific Cascades Minerals Inc	092HNW072	Mo	porphyry Mo	DD, IP	1325
Honeybun	Westminster Resources	092HNW065	Mo	porphyry Mo	DD	1200
Hushamu/NW Expo	IMA Exploration Inc	092L 240	Cu, Mo, Au	porphyry Cu-Mo-Au	DD	5200
Mineral Creek	Bitterroot Resources Ltd	092F 079	Au	veins	DD, UG-BU, PP	6450
Myra Falls	NVI Mining Ltd (Breakwater Resources Ltd)	092F 330	Zn, Cu, Pb, Au, Ag	VMS	DD, UG	n/a
Okeover	Prophecy Resource Corp	092K 008	Cu, Mo	porphyry Cu-Mo	DD	1449
Pearson	Pacific Iron Ore Corporation	092C 091, 092C 022	Fe (magnetite)	Fe skarn	DD, AB	~7872
Quinsam North and 7 South	Hillsborough Resources Limited	092F 319	coal	sedimentary	PD, DD	3508

Note: Myra Falls and Polaris Minerals had not made details of their programs public at the time of writing.

Work Program Abbreviations:

A = access (trail, road construction on claims); AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm)= diamond drilling totalling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping etc.; GC = geochemical sampling (rock, soil, silt etc.); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing (primarily for industrial mineral products); MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; R = reclamation; RC = reverse circulation drilling; TR = trenching; UG (Xm) = X metres of underground development; UG-BU= underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

Pacific Coast Nickel Corp drilled its **Big Nic** property east of Harrison Lake in 2008 with seven core holes totalling 500 m. There were several short intersections assaying more than 0.1 % Ni, however, it does not appear that mineralization corresponding to the impressive massive sulphide float on the property was intersected.

Academy Ventures Inc optioned the **Doctors Point** property, a 1975 discovery of gold in quartz-pyrite-arsenopyrite veins in Gambier Group rocks (Brokenback Hill Formation) on the west side of Harrison Lake. There is a historic resource of 113 600 tonnes grading 2.16 g/t Au and 6.2 g/t Ag. Academy carried out an approximately 1000 m drilling program consisting of 11 holes on three targets.

Also west of Harrison Lake, DJ drilling drilled the **LD** polymetallic vein showing, underlain by Lower and Middle Jurassic Harrison Lake Formation andesites, rhyolite and pyroclastics.

Nomad Ventures Inc optioned the **Krof** (MINFILE 092HNW070) massive sulphide prospect on the east side of Harrison Lake and extended a 2006 airborne survey in 2008 to cover newly staked ground. The airborne survey has identified a northerly trending series of EM anomalies. In addition, 2008 soil sampling identified a

Figure 5.13. Slinging with a long line at the Crack molybdenum project. Despite an extensive road network, the rugged terrain (and road deactivation) necessitated helicopter support for several projects on the east side of Harrison Lake.

nickel anomaly in the eastern part of the property. Known mineralization at Krof consists of stratabound massive and banded copper and zinc rich sulphides in mafic metavolcanics and lesser metasediments of the Cogburn Group.

Whiskey Peak Resources Ltd flew an airborne geophysical survey over its **Harrison Lake** property in the Mount Breakenridge area in 2008. The EM and magnetometer survey covered approximately 1150 line km and indicated a sizeable EM anomaly. The target is ultramafic hosted copper-nickel mineralization

Across the Fraser River from the town of Yale, the Yale First Nation and Lehigh Northwest Materials initiated their activities at **Hillsbar** with an archaeological survey. The target is a sand and gravel resource. Hillsbar is also known for its placer gold in the river gravels. It was the site of a gold rush in 1858, preceding discoveries up-river and the Cariboo Gold Rush.

OUTLOOK FOR 2009

Producers and explorers in the southwest are facing the same economic conditions as the industry in general. At the time of writing, availability of venture capital and other forms of financing upon which the industry depends remain limited. Base metals and thermal coal prices are well off recent highs. Although specifics of aggregate and industrial minerals contracts are generally not made public, several aggregate and industrial minerals producers indicate that they expect flat or somewhat lower demand for their products in 2009. However, not all expect to follow the prevailing trend – a few aggregate producers project higher sales in 2009, based on their individual contracts.

New housing construction, a major consumer of aggregate, cement, building stone, landscaping stone and other industrial mineral products, remains slow in the United States and housing starts have begun to decline in the Lower Mainland. Continuing and possible new public works projects in the local market and along the US west coast will offset this to some extent.

The operators of Myra Falls are watching markets carefully. The mine has made progress toward profitability even in the face of current low zinc prices. Considerable exploration potential appears to remain at this camp, suggested by the ambitious drill programs in 2007 and early 2008.

Several significant exploration programs in the region could see continuation or follow-up in 2009 based on their results. However, those companies with substantial treasuries may choose to conserve cash or seek to acquire new projects at attractive prices. For those companies, the current situation may represent a purchasing opportunity not seen for more than six years.

At the time of writing gold prices are holding up relatively well and Bitterroot Resources and Mineral Creek Ventures have indicated their intention to move forward with the Mineral Creek project, purchasing new equipment to process their bulk sample, now in progress. Preliminary grades and a new discovery (with impressive drill intersections) on the property provide ample incentive to continue this project, particularly with the bulk sample generating revenue.

Selkirk Metals was successful at Catface in 2008. Further work is warranted, based on this year's results.

IMA Exploration has a large treasury and at the moment is focused on their Northern Vancouver Island project. Depending upon results of the current program (unreleased at time of writing), they may choose to continue in 2009.

Compliance Energy Corporation expects to formalize a joint venture agreement with ITOCHU Corp and LG International Corp. With the agreement in place, the company plans a large exploration program on their Raven coal project in 2009.

Figure 5.14. Dan Berkshire beside one of his recently discovered roadside exposures of coal on Vancouver Island.

Prophecy Resources was successful at Okeover in 2007 and 2008 with step-out drilling. They may be in a position to produce a new resource estimate

The new work at Brynnor and Pearson magnetite iron projects on the west coast of Vancouver Island may also leave operators in a position to expand or update their resource estimates. Direct shipping magnetite ore from these deposits located near tidewater could become an attractive proposition assuming prices for iron improve.

Several private companies have plans to go public on the basis of "properties of merit" located in the southwest. While some may proceed as planned, a number of these are expected to await more favourable market conditions than those anticipated in 2009.

There are a number of active prospectors in the Southwest Region, particularly on Vancouver Island. Grassroots exploration is relatively well represented in this region, though it is most often done with limited resources and not all finds are formally reported, much is intentionally kept confidential. This type of work is likely to continue regardless of economic conditions and some of it will ultimately lead to new projects.

ACKNOWLEDGMENTS

Thanks to all those who generously provided access to their properties and access to information over the course of 2008. This article provides only a brief look at the considerable contribution that the mineral industry makes to the regional economy in any given year and can only vaguely suggest its future potential. It is hoped that this article plays some small role in keeping those in government and the public informed of the industry's continuing and future importance to the region's economy.

SOUTHEAST REGION

By David Grieve, PGeo
Regional Geologist, Cranbrook

SUMMARY AND TRENDS

It was another strong year for exploration, development and mining in the Southeast Region of British Columbia, although the impacts of the global economic downturn were definitely felt in the latter part of the year. Significant events in 2008 included:

- record prices for metallurgical coal for Teck Coal Limited's five mines in the Elk Valley;
- the first full year of operation at Roca Mines Inc's MAX molybdenum mine at Trout Lake;
- the opening of Merit Mining Corp's Lexington-Grenoble gold-copper mine near Grand Forks; and
- the start of an ambitious program targeting underground-mineable coal resources near Fernie by Kennecott Canada Exploration Inc.

Exploration expenditures in 2008 are projected to be about $42 million, down only slightly from the record level of the previous year (Figure 6.1). This total was divided between metals (about 58%), coal (41%) and industrial minerals (1%). This represents a significantly higher proportion for coal, and lower proportion for metals, than in the previous year.

Exploration expenditures in 2008 for the various stages may be roughly broken down as follows:

- grassroots exploration – 2%
- early-stage exploration – 50%
- advanced exploration – 42%
- mine property exploration – 6%
- mine evaluation – 0%

In addition to the exploration expenditures, approximately $45 million was spent on mine development projects in the Southeast Region in 2008. The largest development projects were at MAX mine, Lexington-Grenoble mine and Line Creek mine.

An estimated 138 000 m of exploration drilling was carried out in the Southeast Region in 2008 (Figure 6.2). Of this total, roughly 60% represents drilling for metals and 40% for coal (not including mine production and development drilling).

As in previous years, past-producing mines and camps were actively explored. These included programs in the Beaverdell, Rossland, Greenwood, Ymir, Ferguson, Salmo, Moyie and Coal Creek areas.

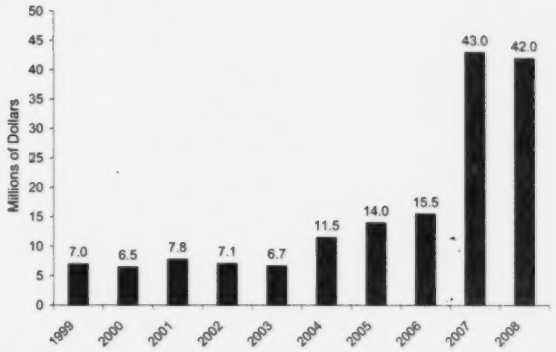

Figure 6.1. Annual exploration spending in millions of dollars, 1999 to 2008, Southeast Region.

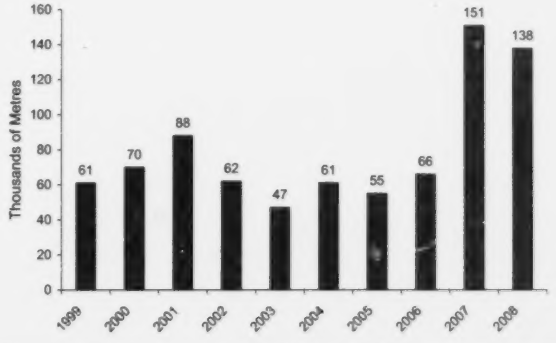

Figure 6.2. Annual exploration drilling in thousands of metres, 1999 to 2008, Southeast Region. Note that prior to 2004 coal production (in pit) drilling at operating coal mines was included in the total.

A time-domain electromagnetic and magnetic airborne geophysical survey was flown over the southern part of the Kootenay Arc in the fall of 2008. The survey, which totals over 4360 line km at a 200 m spacing, was funded jointly by Natural Resources Canada (as part of Targeted Geoscience Initiative-3) and Geoscience BC. Two exploration companies with properties in the survey area, Sultan Minerals Inc (**Jersey-Emerald**) and Dajin Resources Corp (**Oscar**), also contributed to the costs of the survey in order to have the line spacing reduced to 100 m over their properties. The survey area, which is in the vicinity of Salmo, extends over 45 km in a northeast direction from the US border. Besides the **Jersey** lead-zinc and **Emerald** tungsten mines the survey area also

includes the **Reeves-McDonald** and **HB** lead-zinc mines, and the **Sheep Creek** and **Ymir** gold camps. It includes potential for carbonate-hosted, sedex, skarn, porphyry and polymetallic vein-style mineralization.

OPERATING MINES AND QUARRIES

Current major producing mine and quarry locations in the Southeast Region are shown on Figure 6.3 and basic data concerning these operations are listed in Table 6.1.

METALS

There are two small underground metal mines in the Southeast Region, Merit Mining Corp's Lexington-Grenoble gold-copper mine, and Roca Mines Inc's MAX molybdenum mine.

Merit Mining Corp's new **Lexington-Grenoble** (MINFILE 082ESE041) underground gold-copper mine achieved commercial production in June 2008. Prior to commencing production, a 10 000-tonne underground bulk sample was extracted. A temporary shutdown of the Lexington-Grenoble mine was announced near the end of the year, due in part to low commodity prices.

The Lexington-Grenoble mine and the new 200 tonnes-per-day **Greenwood Mill** (Figure 6.4) are major components of the company's **Greenwood Gold Project**, which includes several past producers and other mineral occurrences on both sides of the British Columbia-Washington border between Greenwood and Grand Forks. Lexington-Grenoble is an underground mine with a planned production rate of 72 000 tonnes per year. Prior to production resources included 297 000 tonnes combined measured and indicated resources containing 8.36 g/t Au and 1.35% Cu, at a cut-off grade of 6.0 g/t Au equivalent.

Figure 6.4. Merit Mining Corp's new Greenwood Mill, part of the Greenwood Gold Project, which is processing ore from the Lexington-Grenoble.

The Lexington-Grenoble deposit is hosted by an altered package of dacitic to andesitic tuffs. Mineralization, which is believed to have been emplaced during development of the Republic graben, is hosted by sub-parallel lenses of disseminated to narrow veins of pyrite, chalcopyrite and quartz (with or without native gold) adjacent to a fault contact with serpentinite.

Roca Mines Inc's new **MAX** molybdenum mine (MINFILE 082KNW087) at Trout Lake began shipping concentrate in November 2007, and achieved full commercial production in April 2008 (Figure 6.5). MAX is an underground mine with a production rate of 500 tonnes per day on a campaign basis, for an annual production rate of 72 000 tonnes. Mill capacity is 1000 tonnes per day. A major accomplishment in 2008 was completion of a second adit, which will lower operating costs and improve ventilation.

The MAX deposit contains measured and indicated resources of 42.9 million tonnes grading 0.20% MoS_2 using a 0.10% cut-off. The first phase of production will focus on a high-grade zone which, at start-up, contained 280 000 tonnes of measured plus indicated resources grading 1.95% MoS_2.

Metasediments of the Lower Cambrian to Middle Devonian Lardeau Group at the MAX property are intruded by the Cretaceous Trout Lake stock. The deposit is a pipe-like quartz vein stockwork that extends from surface to a depth of at least 1000 metres, in which molybdenite occurs mainly along margins of veins. The vein stockwork is best developed in close proximity to the margins of the intrusive body and its associated offshoots.

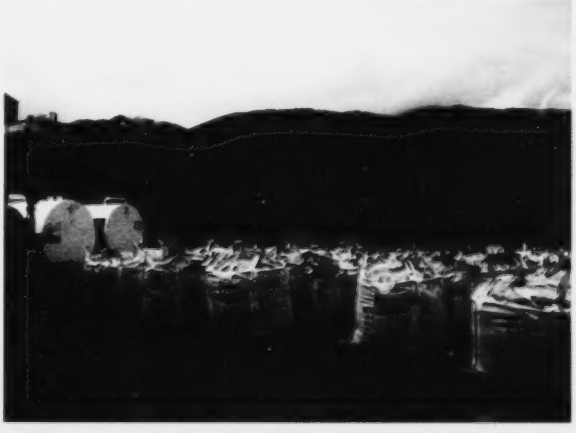

Figure 6.5. Bags of molybdenum concentrate outside Roca Mines Inc's MAX mill.

COAL

Teck Coal Limited, the world's second-largest supplier of seaborne metallurgical coal, operates five large open pit coal mines in the Elk Valley area. Projected

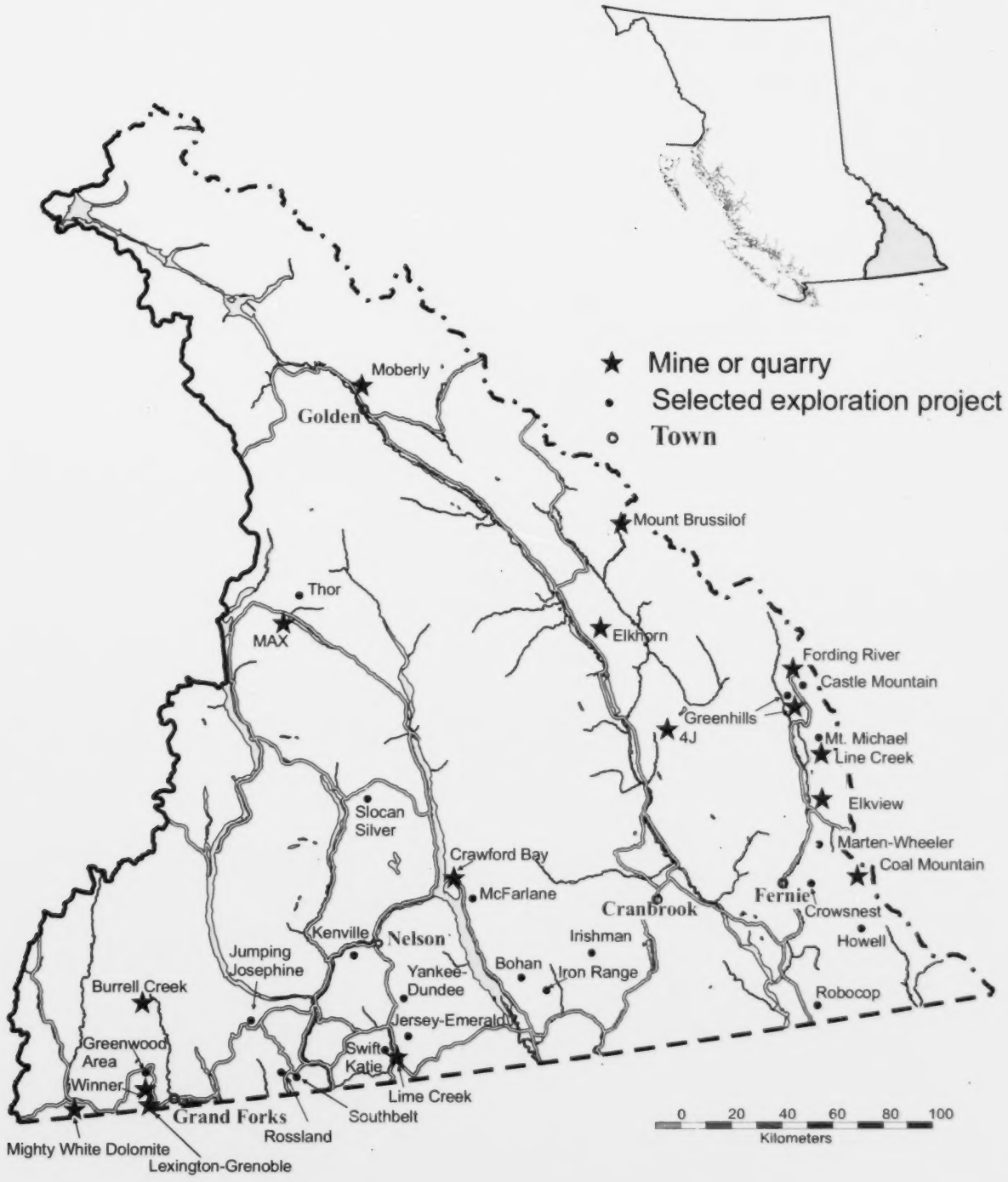

Figure 6.3. Mines, quarries and selected exploration projects, Southeast Region, 2008.

TABLE 6.1. PRODUCING MINES AND QUARRIES, SOUTHEAST REGION, 2008

	Mine	Operator	Commodity	Employment	Forecast 2008 production (million tonnes)	Proven and Probable Reserves as of January 1, 2008 (million tonnes)
Coal						
	Coal Mountain	Teck Coal Limited	Metallurgical coal	228	2.4 (clean coal)	28.2
	Elkview	Teck Coal Limited	Metallurgical coal	850	4.9	235
	Fording River	Teck Coal Limited	Metallurgical coal	968	8.2	216.7
	Greenhills	Teck Coal Limited	Metallurgical coal	505	4.6	88.9
	Line Creek	Teck Coal Limited	Metallurgical and thermal coal	347	2.2	17.4
Industrial Minerals (selected)						
	4J	Georgia-Pacific Canada Inc	Gypsum	11		
	Crawford Bay	Imasco Minerals Inc	Dolomite		0.040	
	Elkhorn	CertainTeed Gypsum Canada	Gypsum	21	0.520	
	Lime Creek	Imasco Minerals Inc	Limestone			
	Moberly	HCA Mountain Minerals (Moberly) Ltd	Silica sand	7	0.048	
	Mount Brussilof	Baymag Inc	Magnesite	21	0.112	
	Burrell Creek	Roxul (West) Inc	Intrusive rock (mineral wool)			
	Rock Creek	Mighty White Dolomite Ltd	Dolomite			
	Winner	Roxul (West) Inc	Intrusive rock (mineral wool)			
Metals						
	MAX	Roca Mines Inc	Mo	100	0.109	Measured and indicated resource of 280 000 t at 1.95% MoS_2
	Lexington-Grenoble	Merit Mining Corp	Au-Cu	43	0.045	Measured and indicated resource of 297 000 t at 8.36 g/t Au, 1.35% Cu

total 2008 coal production at the company's **Coal Mountain**, **Elkview**, **Line Creek**, **Greenhills** and **Fording River** (Figure 6.6) operations is approximately 22.275 million tonnes of clean coal (predominantly metallurgical), up slightly from 2007 (see Table 6.1 for 2008 projected mine production and current reserve statistics). The mines employ 2900 people and make a very important contribution to the local, regional and provincial economies.

Commercially mineable coals in southeast British Columbia belong to the Jurassic-Cretaceous Mist Mountain Formation and are contained in three structurally distinct coalfields. The more northerly Fording River, Greenhills and Line Creek mines are in the Elk Valley coalfield, while the Elkview and Coal Mountain mines are in the Crowsnest coalfield.

Figure 6.6. Eagle Mountain, part of Teck Coal Limited's Fording River Mine.

INDUSTRIAL MINERALS

The Southeast Region continues to be an important source of a variety of industrial minerals, including magnesite, gypsum, silica sand, dolomite, limestone, tufa, flagstone, ballast, aggregate and slag. A selected number of the larger operations are described below, listed in Table 6.1 and shown on Figure 6.3.

Baymag Inc produces high-quality magnesite from its open pit mine near **Mount Brussilof** (MINFILE 082JNW001), northeast of Radium. Magnesite is transported by truck to Exshaw, Alberta, to the company's processing facilities for production of magnesia (MgO). Production in 2008 is projected to be approximately 110 000 tonnes.

There are two gypsum producers in the Kootenay region. CertainTeed Gypsum Canada operates the **Elkhorn** mine (MINFILE 082JSW021) east of Windermere, and Georgia-Pacific Canada Inc operates the **Four J** mine (MINFILE 082JSW009) southeast of Canal Flats. Production at the Elkhorn mine is projected to be approximately 520 000 tonnes for 2008.

Silica sand is produced from friable quartzite by HCA Mountain Minerals (Moberly) Ltd at the **Moberly** mine (MINFILE 082N 001) and plant, north of Golden. Mine production in 2008 is predicted to be 48 000 tonnes, based on material hauled from the pit.

Imasco Minerals Inc produces a variety of crushed and ground rock products at its Creston Operations Plant at **Sirdar**; rock types include limestone, dolomite, granite and quartzite. Raw sources for these products include an underground dolomite mine at **Crawford Bay** (MINFILE 082FNE113), a limestone quarry at **Lime Creek** (MINFILE 082FSW307) east of Salmo, and a granite quarry at **Sirdar** (MINFILE 082FSE072). Production at Crawford Bay is expected to be 40 000 tonnes of dolomite in 2008.

Mighty White Dolomite Ltd produces a range of crushed and ground dolomite products from its quarry (MINFILE 082ESE200) and plant at **Rock Creek**.

The **Winner** quarry (MINFILE 082ESE265), west of Grand Forks, and the **Burrell Creek** quarry, 45 km north of Grand Forks, both supply feed for the Roxul (West) Inc mineral wool (insulation) manufacturing plant in Grand Forks.

EXPLORATION HIGHLIGHTS

Major 2008 mineral and coal exploration projects in the Southeast Region are listed in Table 6.2. Their locations, and locations of some other selected projects, are shown on Figure 6.3. Generally the "major" exploration programs involved expenditures in excess of $500 000 on work that included mechanized ground disturbance, for example, drilling, trenching or bulk sampling. Except where otherwise indicated, the information in this report was derived from discussions with exploration project staff, as well as from company reports, presentations, press releases and Internet websites.

BOUNDARY DISTRICT

Kettle River Resources Ltd was active on a few fronts within its **Greenwood Area** holdings, which encompass many known mineral deposits and occurrences, including the past-producing **Phoenix** (MINFILE 082ESE020) and **Emma** (MINFILE 082ESE062) mines. Trenching and diamond drilling were the main activities in 2008 (Figure 6.7). One component of the work focused on the **Minnie Moore** showing, northeast of the Emma, a 2007 discovery of an epithermal siliceous breccia zone in limestone. The **Battle** zone (MINFILE 082ESE029), immediately south of the Phoenix, comprises an area of gold-bearing quartz-pyrite stockworks and shear zones. Finally, a series of parallel gold-bearing quartz-sulphide veins were targets of the work at the **Stemwinder** zone (MINFILE 082ESE013, 14); these veins were known from the past-producing **Stemwinder** and **Brooklyn** mines.

Activities at the **Jumping Josephine** property, 22 km west of Castlegar and just north of Highway 3, undertaken by joint venture partners Astral Mining Corporation

Figure 6.7. Drilling on Kettle River Resources Ltd's Greenwood area properties.

TABLE 6.2. MAJOR EXPLORATION PROJECTS, SOUTHEAST REGION, 2008

Property	Operator	MINFILE	NTS	Commodity	Target Type	Work program	Metres of drilling (estimated in some cases)
Castle Mountain	Teck Coal Limited (Fording River Operations)	082JSE008	82J/2W	coal	sedimentary	RC	13 854
Crowsnest	Kennecott Canada Exploration Inc		082G/7W	coal	sedimentary	S, RC, DD	3445
Elkview mine (Baldy and Natal ridges)	Teck Coal Limited	082GNE013, 16, 17	82G/15W	coal	sedimentary	RC	3100
Greenhills mine (Cougar North and Phase 6 extensions)	Teck Coal Limited	082JSE010	82J/2W	coal	sedimentary	RC, G	12 524
Greenwood Area properties	Kettle River Resources Ltd	082ESE013, 14, 20, 29, 62	82E/2E	Au, Ag, Cu	epithermal vein, mesothermal vein, skarn	DD, TR, GC, MG	2551
Howell	Max Resource Corp	082GSE037, 48, 70	82G/2E,7E	Au, Ag, Zn, Pb	intrusion-related	DD, GC, P	1300
Jersey-Emerald	Sultan Minerals Inc	082FSW009, 10, 11, 218	82F/3E	Mo, W, Zn, Pb	porphyry (Mo), skarn (W), replacement (Pb, Zn)	DD, TR, G, GC, EN	7925
Jumping Josephine (JJ)	Astral Mining Corp	082ESE275	82E/8E, 82F/5W	Au	intrusion-related	DD, TR, IP	5072
Kenville	Anglo Swiss Resources Inc	082FSW086	82F/6W	Au, Cu	vein, porphyry	DD, IP, MG,	14 058
Marten-Wheeler	Teck Coal Limited (Coal Mountain Operations)	082GNE006, 7	82G/10W	coal	sedimentary	RC	13 071
MAX	Roca Mines Inc	082KNW087	82K/12E	Mo, W	porphyry (mo), skarn (W)	G, GC, DD	1914
McFarlane	Jasper Mining Corporation	082FNE125	82F/10W	Mo	porphyry	DD, GC	14 580
Mt. Michael	Teck Coal Limited (Line Creek Operations)	082GNE022	82G/15W	coal	sedimentary	RC	8903
Rossland	West High Yield (W.H.Y.) Resources Ltd	082FSW119, 116, 117	82F/4W	Mg, Ni, Au, Co	ultramafic, mesothermal vein	DD	5700
Slocan Silver	Klondike Silver Corp	082FNW013, 43, 50	82F/14W	Ag, Pb, Zn	vein	P, G, GP, GC, UG, UG-DD	350
Southbelt	Rossland Resources Ltd	082FSW123, 145, 146	82F/4W	Ag, Au, Pb, Zn, Cu	polymetallic vein	DD, GP	2750
Swift Katie	Valterra Resource Corporation	082FSW290, 291	82F/3W	Au, Cu	porphyry	AB-GP, DD	2954
Thor	Taranis Resources Inc	082KNW030, 31, 60, 61, 62	82K/11W	Au, Ag, Cu, Pb, Zn	massive sulphide	DD, GC	8765
Yankee –Dundee	Dundee Mines Ltd	082FSW067, 068	82F/6E	Au	mesothermal vein	P, G, AB-GP, DD	2975

Work Program Abbreviations:
A = access; trail, road construction on claims; AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totaling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping, etc; GC = geochemical sampling (rock, soil, silt, etc); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing-primarily for industrial mineral products; MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = Pilot plant, R = reclamation; RC = reverse circulation drilling; TR = trenching, UG (X m) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

(60% owner) and Kootenay Gold Inc have been centred on a 2003 discovery of high-grade gold mineralization known as the **JJ Main** zone (MINFILE 082ESE275). Mineralization in this zone is hosted by Jurassic intrusive rocks of the Nelson plutonic suite, and may be related to a later-phase Jurassic intrusion that does not reach surface. Occurrences of Eocene Coryell syenite are also widespread. Mineralization (chiefly pyrite and arsenopyrite) occurs with quartz in stockworks, vein-breccias, ladder veins and sheeted veins, and is associated with a prominent northeast-trending shear zone. Geology, geophysics and geochemistry suggest that the host structure may extend for over 2.5 km. The possibility of more deep-seated porphyry-style mineralization is also being assessed.

Exploration in 2008 included IP chargeability, diamond drilling and trenching. This large property also has other zones with potential economic mineralization, and in addition Astral Mining holds large blocks of adjacent ground.

West High Yield (W.H.Y.) Resources Ltd carried out a third major phase of diamond drilling on its **Rossland** project on the western outskirts of the town of Rossland. Past producers of gold on the company's property include the **Midnight**, **OK** and **IXL** (MINFILE 082FSW119, 116 and 117). Gold mineralization is associated with ultramafic contacts and a regional tectonic boundary, and consists of gold-bearing quartz-carbonate veins in contrast to the more typical Rossland-style base metal sulphide-rich veins. The major effort in 2008 was focused on the Mg potential of the **Record Ridge** ultramafic body, which, along with the OK ultramafic body, has potential for magnesium, nickel, cobalt and gold. Preliminary metallurgical testing of the extractability of magnesium from drill core of ultramafic material was carried out in 2008.

In the same camp, Rossland Resources Ltd drilled the **Southbelt** property in 2008. The property includes the so-called Rossland Southbelt veins (*e.g.* MINFILE 082FSW146, 145 and 123) hosted by Jurassic Rossland Group volcanics, immediately south of the town of Rossland.

WEST KOOTENAYS

The **Jersey-Emerald** project 10 km south of Salmo was the site of extensive drilling by Sultan Minerals Inc. The underground **Jersey** lead-zinc and **Emerald** tungsten mines (MINFILE 082FSW009, 10, 11 and 218) closed in 1973. Exploration by Sultan over the past few years has focused on molybdenum and tungsten, and was recentiy expanded to include zinc and lead. Work in 2008 included large underground and surface diamond drilling programs designed to test the East Emerald Tungsten zone and the East Dodger Molybdenum zone. Environmental-baseline studies are also underway.

Stratabound zinc-lead mineralization in the Jersey mine is associated with Paleozoic carbonates near the south end of the Kootenay Arc. Six un-mined tungsten targets were reported by the operator at the time of the closure of the Emerald mine, which lies beneath the Jersey zinc-lead bodies. These targets occur as broad linear bands trending for more than 1500 m to the north and south of the old mine workings. In addition, another target referred to as the East Emerald Tungsten zone, associated with a unit referred to historically as the "lower skarn horizon", was identified by Sultan Minerals from historic mine plans and drill logs. This new zone lies between the Invincible and Dodger Tungsten zones, and has been shown to extend more than 1000 m in length and 200 m in width. It is a low-grade, bulk tonnage target. Molybdenum-bearing, granitic intrusion-hosted quartz stockworks lie beneath the old tungsten mine workings in the East Dodger mine area. Molybdenum is also associated with tungsten in the East Emerald zone.

Duncastle Gold Corp carried out a large diamond drilling program on the **Yankee-Dundee** property near Ymir. The property includes several past producers, including the **Yankee Girl** (MINFILE 082FSW068), and the **Dundee** (MINFILE 082FSW067), which produced polymetallic (silver, lead, zinc, gold) veins. The objective of the current exploration program, which included diamond drilling and an airborne EM/magnetic survey in 2008, is to identify extensions of the high-grade material that was worked in the past.

Mineralized veins are mainly hosted by argillites and quartzites of the Jurassic Ymir Group, which were intruded by granodiorites of the Middle to Late Jurassic Nelson plutonic suite. Veins are typically composed of quartz, pyrite, galena and sphalerite.

Roca Mines Inc carried out two initial surface diamond drilling programs at the **MAX** molybdenum mine. A biogeochemical Mo anomaly in close proximity to the MAX portals found in 2007 by workers conducting research under the Geological Survey of Canada's Targeted Geoscience Initiative was one target for drilling. Two drillholes intersected a wide zone of intense silicification, quartz veining and sericite alteration with trace molybdenite throughout. By analogy with the MAX deposit itself, this new zone may represent the uppermost portions of a new Mo system. The Ridge Tungsten zone on the MAX mine property was also drilled. From previous mapping this tungsten skarn zone was known to occur over a strike length of 1400 m, and the 2008 drilling targeted the southern part. Drill results suggest that tungsten mineralization, which lies above the mine, may be accessible from the underground workings.

Taranis Resources Inc's **Thor** property (Figure 6.8), located on the eastern flank of Great Northern Mountain in the Ferguson area, was the site of an intensive drilling program in 2008. The property encompasses several polymetallic (silver, lead, zinc, gold, copper) mineral occurrences, including the past-producing **True Fissure** (MINFILE 082KNW030), **Great Northern** (MINFILE

Figure 6.8. Field office at Taranis Resources Inc's Thor property.

082KNW061) and **Broadview** (MINFILE 082KNW031). Results to date, including geophysical surveys conducted in 2007, suggest strongly that the various known occurrences, previously classified as polymetallic veins, are part of a single, laterally-extensive, faulted and stratabound massive sulphide system with volcanogenic massive sulphide (VMS) affinities. This system has been dubbed the "combined metals unit" (CMU) by the company. Sulphides occur both in massive form as well as associated with quartz breccia.

The CMU on the Thor property occurs in association with the contact between a volcaniclastic and an argillaceous unit within the Broadview Formation of the Paleozoic Lardeau Group. The contact dips steeply to the east and is overturned on the west limb of the north-northwest-plunging Broadview Anticline. To date mineralization has been demonstrated to occur over a distance of greater than 1.6 km parallel to the fold axis, and tectonic thickening may occur along this trend. The close association with a graphitic fault zone has allowed for geophysical extrapolation and correlation of the various mineralized zones. For example, the True Fissure zone is believed to be a faulted-off portion of the larger Great Northern zone.

Work in 2008, which included 8765 m of diamond drilling, has focused on further developing the VMS model and defining the source of mineralization, affirming correlation and continuity of the various zones, and defining resources.

The **Slocan Silver** project, east of New Denver, is in a rich past-producing district of vein-style silver-lead-zinc mineralization. Major progress was made in 2008 by Klondike Silver Corp. Klondike's holdings have been broken down into six areas, each of which encompasses several past producers. These include **Sandon**, **Hewitt-Van Roi**, **Silverton Creek**, **Cody Creek**, **Payne** and **Jackson Basin**. The company's **Silvana mill** at Sandon, a 100 tonnes-per-day concentrator, is currently operational and is processing ore-grade material from this project and another project in western Canada. Moreover, shipments of concentrate from the mill to a smelter have begun.

Klondike Silver activities on the Slocan Silver project range from prospecting, geological mapping, geophysics and soil geochemistry to underground drilling, rehabilitation, development and small-scale production. The overall objective is to discover new lodes or extensions of the known deposits through the use of modern exploration technologies. In the cases of the past producers, an emphasis is on locating and recovering zinc-rich zones that may have been previously ignored.

Underground work in 2008 at the **Silvana** (MINFILE 082FNW050), **Wonderful** (MINFILE 082FNW043) and **Hinckley** (MINFILE 082FSW013) mines, all past-producers in the Sandon area, was intended to outline bodies of mineralization in the range of thousands to tens of thousands of tonnes, and resulted in delivery of mineralized rock to the Silvana mill. Surface work included geology, geochemistry and geophysics at several locales. New mineral showings have been discovered this year in the Hewitt-Van Roi area. Vein-hosted mineral occurrences in the Slocan are hosted by sheared and brecciated argillite and slate of the Triassic Slocan Group, which are intruded by granodiorite and quartz monzonite dikes.

Valterra Resource Corporation undertook a large diamond drilling program on its **Swift Katie** property, southwest of Salmo. The **Katie** portion of the property (MINFILE 082FSW290) is host to an alkaline Cu-Au porphyry occurrence, while the **Swift** (MINFILE 082FSW291) hosts gold mineralization related to shear zones, but is considered to have potential for porphyry-style mineralization at depth.

The Swift Katie property is underlain by Rossland Group volcanics and sediments. Mineralization is primarily hosted by intermediate to mafic volcanic rocks, including flows and tuffs, of the Elise Formation. Mafic intrusive rocks of probable synvolcanic origin are closely associated with the volcanics. Rossland Group in the area is intruded by Middle Jurassic Nelson intrusions as well as Tertiary stocks and dikes.

In the Katie alkaline porphyry occurrence sulphide minerals, mainly pyrite and lesser chalcopyrite, occur disseminated in volcanic and intrusive rocks or in veinlets of quartz, calcite, potassium feldspar, chlorite and epidote. Mineralization is associated with propylitic and potassic alteration.

Anglo Swiss Resources Inc was very active on its **Kenville** property, roughly six kilometres west of Nelson. The Kenville (MINFILE 082FSW086), also known as the Granite-Poorman, operated intermittently between 1890 and 1954, with the bulk of production from 1899 to 1912. More than 180 000 tonnes of ore were mined, which yielded over 2 million grams Au and 861 000 grams Ag. Production averaged more than 17 g/t Au, from a series of thin, northeast-dipping quartz veins. Hostrocks are lower Jurassic "pseudodiorites" and pyroxenites which are

intruded into, and may be intrusive equivalents of, basalts of the lower Jurassic Elise Formation of the Rossland Group. Middle Jurassic (Nelson suite) and Tertiary intrusive rocks are also common in the immediate area.

Recent work by Anglo Swiss has focused on underground rehabilitation, mill upgrading, and diamond drilling, as well as pilot production and marketing of aggregate from old waste dump material. The company wants to be in a position to embark on a pilot underground gold production and milling program, while continuing to explore for extensions of known ore-grade material and new mineralization. Veins occur in two groups, one being the system of veins that were mined in the past on the east or Kenville Mine side of the property, and the other a system of veins on the west side of the property referred to collectively as the Eagle vein. Drilling has been directed at evaluating both groups of veins as well as the potential for porphyry-style gold-copper. The company reports the discovery of up to four new veins on the west side of the property. Also, a significant Cu-bearing shear zone that parallels the vein systems has been outlined on the west side of the property.

EAST KOOTENAYS

Jasper Mining Corporation carried out another large diamond drilling program on its **McFarlane** molybdenum property (MINFILE 082FNE125) east of Kootenay Lake near the community of Gray Creek. Cretaceous quartz monzonite is the predominant host lithology. Molybdenite is associated with quartz veins which may represent the uppermost portions of a porphyry system. Individual veins are up to 1.5 m in thickness, and may also contain pyrite and sericite. The company believes there may be potential for recovery of both high-grade material and bulk-tonnage lower-grade material. An independent resource assessment will be carried out in the near future. The property is adjacent to the company's **Lydy** molybdenum property.

Max Resource Corp drilled the **Howell** gold property, which straddles Howell and 29 Mile creeks approximately 45 km southeast of Fernie. At the Howell property Upper Cretaceous syenites are intruded into platformal sedimentary rocks. Mineralization occurs as disseminations in Paleozoic carbonates and as quartz stockworks in both intrusives and sediments. There is also believed to be potential for carbonate replacement-style mineralization.

The search for stratabound base metal mineralization in the Proterozoic Purcell Supergroup, including sedex-style lead-zinc at the Sullivan horizon in the Aldridge Formation, continued on several fronts, although efforts were in general scaled back from the past few years. Ruby Red Resources Inc drilled the **Robocop** property (MINFILE 082GSW019), on the east side of the Rocky Mountain Trench 80 km southeast of Cranbrook. The Robocop hosts Cu-Co mineralization in sandstone in the upper part of the Purcell Supergroup. Eagle Plains Resources Ltd drilled on both the **Bohan** (MINFILE 082FSE125) and **Iron Range** (MINFILE 082FSE014 to 28) properties to the east of Creston. There are two styles of mineralization present at the Iron Range, sedex lead-zinc associated with the Sullivan horizon, and Cu-Au associated with iron oxide mineralization along the Iron Range fault. There is also potential for sedex-style mineralization at the Bohan property, although at a higher stratigraphic position within the Purcell Supergroup. Lastly, Klondike Gold Corp completed a drillhole begun in 2007 at the **Irishman** property (MINFILE 082FSE110) 35 km southwest of Cranbrook. The Sullivan horizon was intersected in the Irishman hole, and it contained sulphide mineralization reminiscent of distal fringes of sedex-style occurrences.

EAST KOOTENAY COALFIELDS

Exploration in the coal-bearing Jurassic-Cretaceous strata of the Mist Mountain Formation (collectively known as the East Kootenay coalfields where they occur in British Columbia) in 2008 was carried out by Teck Coal Limited (formerly Elk Valley Coal Corporation) and Kennecott Canada Exploration Inc. This work contributed significantly to the overall exploration totals in southeast BC. Not including production and development drilling at Teck Coal's five mines, coal exploration expenditures totalled over $17 million and coal exploration drilling totalled close to 55 000 m, the bulk of it rotary drilling.

In some cases unconventional drilling techniques were used. Notably, Teck Coal is successfully utilizing large-diameter, reverse-flood rotary drilling for the collection of bulk samples, cutting down significantly on sampling costs. In the case of Kennecott Canada Exploration's deep drilling program, oil and gas exploration equipment, including blowout-prevention technology, was used (Figure 6.9).

Figure 6.9. Drilling on the Crowsnest coal project, Kennecott Canada Exploration Inc.

All of Teck Coal's five metallurgical coal mines carried out major exploration programs in 2008, aimed at establishing reserves outside of the active pits. Beginning in the Elk Valley coalfield, Fording River Operations drilled on **Castle Mountain** (MINFILE 082JSE008), 5 km south of and along strike from, active **Fording River** mine pits on **Eagle Mountain** (MINFILE 082FSE009), and roughly 10 km northeast of Elkford. The Mist Mountain Formation at this location is preserved on both limbs of the Alexander Creek syncline.

Greenhills Operations drilled the **Cougar North Extension** and **Phase 6 Extension** areas at the north end of the **Greenhills** mine (MINFILE 082JSE007) on the Greenhills Range; coal seams are contained within the Greenhills syncline.

Line Creek Operations drilled on **Mt. Michael** (MINFILE 082GNE022), approximately 3 km north along strike from the **Line Creek** mine, and roughly 9 km southeast of Elkford. Surface-mineable coal seams are on the east limb of the Alexander Creek syncline and dip moderately to the west.

The other coal exploration projects were carried out in the Crowsnest coalfield (or Fernie Basin), a broad synclinorium to the south of the Elk Valley coalfield. Elkview Operations carried out rotary-drilling programs in the **Baldy Ridge** (MINFILE 082GNE016) and **Natal Ridge** (MINFILE 082GNE013) areas, at the western and eastern extents of the **Elkview** mine, respectively.

Coal Mountain Operations continued to assess the potential of the **Marten-Wheeler** area (MINFILE 082GNE006, 7), roughly 19 km northeast of Fernie and immediately south of **Parcel 73** of the Dominion Coal Block (MINFILE 082GNE008). This site, which encompasses Marten, Wheeler and Hosmer ridges, is not structurally contiguous with **Coal Mountain** mine and is approximately 18 km distant. Surface-mineable coal in the Marten-Wheeler area tends to be of higher volatile-matter content than current typical products from Elk Valley's mines.

Kennecott Canada Exploration Inc began evaluation of their **Crowsnest** property in the Crowsnest coalfield, approximately 8 km east of Fernie. The Mist Mountain Formation on this property is overlain by younger Kootenay Group and Blairmore Group strata and is relatively flat-lying. Coal seams at this location are essentially the easterly, down-dip extensions of coals which crop out and were mined underground at the **Coal Creek Colliery** between 1898 and the 1950s. The objective of the Crowsnest project is to identify reserves of metallurgical coal mineable by underground longwall techniques. Longwall mining requires large panels of relatively flat-lying, undisturbed coal of reasonable thickness; the company is targeting areas distant from faulting and folding, and within the upper part of the Mist Mountain Formation. The target coal seams are referred to as A, 10, 9 and 8 based on the nomenclature at the Coal Creek colliery. Exploration in 2008 consisted of a seismic survey and deep drilling using both rotary and core drilling for interseam strata and coal seams, respectively.

OUTLOOK FOR 2009

It is anticipated that next year will be challenging for the industry in southeast BC. All signs are that it will be difficult to attract investors for exploration projects, and that the economics of some existing mining operations will be affected by lower commodity prices. Consequently, exploration expenditures could drop substantially, and mine production totals may also decline.

On the other hand, southeastern BC boasts well-developed infrastructure, and is host to a wide variety of commodities. These factors may partially mitigate the impacts of the economic downturn.

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